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State of Play of Digital Games for Empowerment and Inclusion:

A Review of the Literature and Empirical Cases

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Preface

In Europe today an estimated 110 million people are at risk of social exclusion. This presents society, entrepreneurs and policy makers with a challenge that calls for social innovation of all types to tackle low skills, unemployment, discrimination, barriers to disabled people, poor health and other factors associated with social exclusion.

The Information Society Unit at the JRC IPTS leads research to explore and show when and how information, communication and media technologies can both shape the conditions of social exclusion, and offer pathways to social inclusion, particularly when used by social inclusion actors and intermediaries. Previous research has demonstrated how 'conventional' technologies such as the PC and internet applications can support socio-economic inclusion processes for populations at risk of exclusion such as migrants, youth at risk, and the elderly and their carers. In recent years there has been growth of research and commercial activity in the use of digital games for non-leisure activities and the promise of gamification as a building block of social innovation promoted DG CNCT and the JRC-IPTS to launch a study, *Digital Games for Empowerment and Inclusion (DGEI).* The goal was to better understanding of how this hugely popular media form is being applied to issues of concern for social inclusion policy, and inform future policy options.

The main output of the study is the JRC Scientific and Policy report *" The Potential of Digital Games for Empowerment and Social Inclusion of Groups at Risk of Social and Economic Exclusion: Evidence and Opportunity for Policy.* It is accompanied by two JRC technical reports, of which this is one. This report presents a detailed literature review of the current state of research knowledge and original empirical research practice. It addresses not only the way that games work, but explores the conditions under which games are used in practice, and the challenges facing the production of special-purpose games.

It is hoped that this report will support games and social inclusion researchers and practitioners, policy makers, and other stakeholders in their work to exploit the world of game development and use in to forward both social goals and research and business projects.

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Introduction

Empowering citizens is high on the EU agenda, and research hints towards the potential of games as empowerment tools. However, there is an evident lack of coherent and substantial information on this topic. Presenting a first attempt to tackle this issue, this report covers the following elements:

- A state-of-the-art review identifying the field, its specific application domains, facts on adoption and diffusion, available research evidence, relevant theoretical perspectives and knowledge gaps
- Case studies describing well-documented cases in the field and the factors contributing to their success or failure
- A conceptual framework that foster understanding of the potential of games for inclusion and empowerment and the opportunities and challenges that stakeholders in this domain face
- Conclusions from a research and policy perspective, proposing future research tracks and action domains for policy makers

In what follows, we will describe the policy context in which this study emerged, the study's objectives, and the methods that we applied.

Policy context

This study can be placed within the frame of different EU policy agendas and initiatives such as the Riga Declaration (2006); the Lisbon Declaration on e-Inclusion (2007); the European i2010 initiative on e-Inclusion: Be part of it; the Digital Agenda 2020; and the Gdansk Digital Inclusion Roadmap (2011). In the policy framework "i2010: A European Information Society for Growth and Employment", e-inclusion was put forward as a strategic policy goal, stating that everyone should be able to enjoy the benefits of ICT. Building on this, the Riga Declaration (2006, p.1) defined e-Inclusion as "both inclusive ICT and the use of ICT to achieve wider inclusion objectives" and identified, as one of its six priorities, "digital literacy and competence actions, in particular through formal or informal education systems, building on existing initiatives. These actions will be tailored to the needs of groups at risk of exclusion, because of their social circumstances or their capacities and special needs, notably the unemployed, immigrants, people with low education levels, people with disabilities, and elderly, as well as marginalized young people, contributing to their employability and working conditions." The Digital Agenda 2020 emphasizes the importance of empowerment: "The digital era should be about empowerment and emancipation; background or skills should not be a barrier to accessing this potential" (European Commission, 2010a, p.24).

This study touches upon innovative ways of learning, especially for groups at-risk, and hence, can also be framed in the policy agendas and initiatives related to learning and social well-being such as the new EU Youth Strategy entitled 'Youth – investing and empowering'; the Active Ageing program; and the Lifelong Learning program. In addition, in view of the importance given in this study to actual impact of e-inclusion activities and informal learning opportunities, it can also be placed in the context of the Europe 2020 strategy that aims to have "at least 40% of 30-34–year-olds completing third level education" and to succeed in attaining "at least 20 million fewer people in or at risk of poverty and social exclusion" and to have "75% of the 20-64 year-olds to be employed." More specifically, this study can be framed in two of the seven flagship initiatives of the

Europe 2020 strategy, namely An Agenda for New Skills and Jobs and the European Platform against Poverty and Social Exclusion. Especially the latter is valid as it promotes (1) evidence-based social innovation; and (2) acknowledges the role of third sector organizations for social inclusion (European Commission, 2010b).

Scope

In the research from which this report results, we have pursued the following **objectives**:

- **State of the art**: To analyze the state of the art of research and practice in the area of digital games for empowerment and inclusion
- **Opportunities and challenges**: To define key (technological, research, policy, industry/market, social, economic) opportunities and challenges of using digital games for empowerment and social inclusion purposes
- **Conceptualization**: To develop a conceptual framework providing theoretical orientations to better understand and identify the potential of digital games for empowerment and inclusion

This is reflected in the report as follows. After an explication of the key concepts, we present the reader with a review of existing research and practice in the area of digital games for empowerment and inclusion. Here, we provide an overview of the field, discussing application domains, exploring the diffusion and adoption of digital games and play (stakeholders, facts and figures, drivers and barriers), and evidence for impact.

We continue with a set of seven case studies in which we analyze the ecosystem surrounding each case and establish key factors for success or failure. We then propose a conceptual framework, which can help to understand the potential of digital games for empowerment and inclusion. By joining findings from the literature review and the case studies, we aim to identify the key opportunities and challenges faced by various stakeholders who use digital games for empowerment and social inclusion.

While our report aims to give a broad overview on the use of digital games for empowerment and inclusion, it will become clear that we have given specific attention to three **forms of empowerment, which digital games may potentially support**:

- **Civic engagement and community building**: Increasing civic engagement, social integration, social capital and community participation
- **Health and well-being**: Supporting mental, physical and social well-being
- **Education and employment**: Facilitating education and the process of obtaining and maintaining employment

With regard to **target populations**, a similar approach has been adopted. While the use of Digital Games by people at risk of exclusion (for instance, youth not in employment, education or training (NEET); Elderly; Migrants and ethnic minorities) was of specific interest, it did not delimit the scope of our review. The reason for this is twofold. On the one hand, research on applications for a mainstream audience can provide evidence that is also relevant for these populations. On the other hand, we did not wish to limit our analysis to end users, but also wanted to include the perspective of professional users and organizations that give shape to the context of use.

Finally, in this study, specific attention was given to how **learning and participatory processes** surrounding digital game play may foster empowerment and social inclusion. As will become apparent, our conceptualization of learning is not limited to acquiring

knowledge, nor restricted to formal educational settings (see also the intro of Section 4 for a more detailed explanation). It encompasses a wide range of DGEI research studies and practices that will be addressed after the final section of this introduction in which we specify our methodological approach.

Methodological approach

This section describes the methods that we applied to generate this report. Methods included literature review and case studies. For some of the cases, experts were consulted to complement as our findings and to handle particular issues more into depth. Findings from the literature review and case studies were used to build a conceptual framework encompassing an overview of the domain and identification of opportunities and challenges that the stakeholders who are active in this domain face.

Literature review

Our search for relevant literature was structured by consideration of articles, papers and reports relevant to the scope of this report, that is, digital games for empowerment and inclusion (DGEI). Specifically, we looked for sources that addressed:

- Empirical research: Evidence of impact and forms of assessment
- Practice: Adoption, Usage and diffusion
- Theory: Concept explication, theoretical perspectives on game play, learning in and around games, adoption and usage

We considered two types of sources:

- Sources specific to the application domains of interest (Employability; Well-being and social welfare; Civic participation and community building)
- Sources overarching different application domains.

Case studies

The case studies serve to provide an in-depth analysis of the drivers and the barriers for games for empowerment, specifying the issues encountered by the stakeholders involved.

Cases were selected on the basis of the following criteria:

1. **Application domain**: Cases should be part of the aforementioned application domains representing a spread of examples on employability, well-being and civic and communal participation
2. **Documentation**: Cases should be reasonably well-documented
3. **Constituency**: Cases should be illustrative of interactions among various actors, having built a network of stakeholders around the game use
4. **Impact**: Cases should show some form of impact in the real-world practice. Ideally, some form of assessment is present (i.e. evaluated for effectiveness, at least in a trial, compared with other ways of achieving the same ends)
5. **Innovation**: Cases should demonstrate leading edge practice, inform existing knowledge gaps

Within the given selection criteria, cases were selected so as to obtain sufficient variation in terms of:

1. **Initiation**: Including cases that are both professional or end-user initiated, initiated in a commercial or research context, with different types of producers
2. **Game play design**: Diversity in game play mechanics, interaction, links with other media
3. **Hardware platforms**: Including cases with various hardware platforms (e.g. PC & Internet, handhelds, television)
4. **Region**: Including European and non-European cases

This resulted in the selection of the following seven cases, which we only describe briefly here, as they will be handled in detail in the associated Case Studies section.

1. **PING (http://www.povertyisnotagame.com/)**: Role-play game for secondary school students to enhance their awareness on poverty amongst young people, to make young people aware about different possibilities and institutions
2. **InLiving (http://www.inliving.co.uk/about-us/)**: A role-playing game promoting citizenship and participation at community level, policy awareness, and learning about government budgeting
3. **At-Risk (http://www.kognito.com/products/)**: Avatar-based learning game for university and college faculty members to learn to identify, approach and refer students who are dealing with psychological distress
4. **Choices and Voices (http://www.choicesandvoices.com/)**: Short role-play games for pupils to prevent violent extremism, promote community cohesion, team work, understanding on social and economic inequality
5. **Starbright world (http://www.starbrightworld.org)**: An online social network where teenagers who are seriously ill and their siblings and friends can get in touch with each other through different means including games, online fora and chat rooms
6. **Civilization and CivWorld (http://www.facebook.com/civworld)**: Respectively, strategy game series and simplified Facebook version, both multi-player
7. **Gamestar Mechanic (http://www.gamestarmechanic**): A game-based learning platform that allows people to play, create and share games

For analyzing each of these cases, the central question was:

Which factors contributed to the success or failure of the given case?

To identify these factors, we constructed an analytical framework based on **product ecology theory** (Forlizzi, 2008). The product ecology framework, which draws from social ecology, supports the investigation and description of how people build up social relationships with products by defining key factors in the ecology surrounding product use (i.e. products, people, roles, place) and how these change over time.

Specifically, in the case studies we identify characteristics of the used product (technology, goals, target audience, budget etc.), stakeholders (initiators, makers, intermediaries, users) and usage context and describe how these key factors represent external challenges, opportunities for and inherent strengths and weaknesses of games as empowerment tools.

The information sources consulted for the case studies include the game website, other online documentation, academic literature and experts.

Conceptualization

The conceptual work presented in this report is intended to facilitate understanding of the usage of digital games for empowerment and inclusion (DGEI). To achieve this goal, the conceptual work in this report encompasses the following components:

- **Concept explication**: Defining key **concepts** that are central to the discussion concerning games for empowerment and inclusion
- **Framework construction**: Laying the foundation for a conceptual framework that clarifies the potential and limitations of digital games with respect to promoting empowerment and inclusions, which stakeholders that are involved, their approaches and the opportunities and challenges they are likely to be faced with, and the keys to successful DGEI projects.

Concept explication is drawn from both research articles as well as policy reports. The conceptual framework was drawn from the literature review and case studies and has undergone several iterations. In a first phase, initial findings from the review and case studies were categorized into opportunities and challenges on a micro-, meso- and macro-level (i.e. relative to the immediate context of use, the organizational and societal context, respectively). In a second phase, we presented visualizations of the different layers of game-based initiatives (i.e. development & distribution, selection & acceptance, usage and assessment) to experts during the DGEI Expert Workshop, who we also asked to identify opportunities and challenges. This complemented our work and also served as a validation. In a final iteration, we updated our framework, organizing it around four main questions and synthesizing our findings accordingly:

1. Why (should) DGEI work?
2. Which approaches exist and which opportunities and challenges do stakeholders encounter?
3. Who is involved in DGEI?
4. What are the foundations of successful implementation of DGEI projects?

1. Key concepts

Before diving into the insights that we gathered from reviewing research and practice concerning digital games for empowerment and inclusion (DGEI), we need to establish a common ground for understanding the concepts involved - inclusion, empowerment and digital games – and their interrelationship. In this first section, we will cover this extensively.

Note that throughout this section and the remainder of this report, we provide pull out boxes, which summarize subsections (to conclude a subsection) or highlight particular elements in the discussion.

1.1. Inclusion

In this part, we elaborate on the inclusion concept with an emphasis on e-inclusion. We first address the complex relationship between social exclusion and inclusion (Section 1.1.1) and the various ways in which e-inclusion is understood (Section 1.1.2). We then discuss the potential (Section 1.1.3) and drawbacks (Section 1.1.4) of using digital media and technology to promote social inclusion and conclude that a multi-stakeholder approach is warranted for such a complex phenomenon (Section 1.1.5). While this discussion concerns the use of digital tools in general, we believe it brings up issues that are worthwhile for all who consider using specifically digital games to achieve social inclusion.

1.1.1. Social exclusion and inclusion

During the last decade, that of social inclusion has steadily replaced the concept of social exclusion. Although both concepts are related, they inherently carry a distinctive normative meaning and policy approach (Jehoel-Gijsbers & Vrooman, 2007). Whereas social exclusion deals with the identification and understanding of the different barriers and issues that hamper the full participation of individuals in society, social inclusion consists of the delivery of the necessary opportunities and resources to ensure the full societal participation of individuals.

Their distinct meaning is stressed in the following definitions: On the one hand, **social exclusion** is defined as "a process whereby certain individuals are pushed to the edge of society and prevented from participating fully by virtue of their poverty, or lack of basic competencies and lifelong learning opportunities, or as a result of discrimination. This distances them from job, income and education and training opportunities, as well as social and community networks and activities. They have little access to power and decision-making bodies and thus often feel powerless and unable to take control over the decisions that affect their day-to-day lives" (World Bank, 2007, p.4).

On the other hand, the notion of **social inclusion** refers to "a process which ensures that those at risk of poverty and social exclusion gain the opportunities and resources necessary to participate fully in economic, social and cultural life and to enjoy a standard of living and well-being that is considered normal in the society in which they live. It ensures that they have a greater participation in decision making which affects their lives and access to their fundamental rights" (COUNCIL OF THE EUROPEAN UNION (2004)

A large number of studies show that social exclusion is a complex and multi-faceted process that is caused by dynamics that are often intertwined and as such strengthen each other and often lead to simultaneous deprivation at the level of work, education, living

conditions, income, social security, daily resources or health (Brants & Frissen, 2003; Daly et al., 2008; Jehoel-Gijsbers & Vrooman, 2007; Wright & Wadhwa, 2010). Consequently, factors like health, education, employment and equitable participation are brought to the fore as key priorities in social inclusion policies. Bianchi et al. (2006) state that inclusion policies should have an augmented focus on employment and education and training. Individuals that are unemployed, especially on long-term bases, run a severe risk of gliding into poverty and hence, risk experiencing a gradual decline of their social mobility opportunities. Also, being unemployed carries a social stigma and implies the need for the acquisition of new skills in line with the demands and needs of the labor market (Bianchi et al., 2006). However, it is important to acknowledge that income and employment are necessary to achieve inclusion but not sufficient (Mancinelli, 2008). Selwyn (2003, p.11) refers to the **various dimensions of participation** in society as a possible framework for defining the different domains to be addressed by inclusion policies:

- Production activity: Engaging in an economically or socially valued activity, such as paid work, education/training and looking after a family
- Political activity: Engaging in some collective effort to improve or protect the social and physical environment
- Social activity: Engaging in significant social interaction with family or friends and identifying with a cultural group or community
- Consumption activity: Being able to consume at least a minimum level of the services and goods which are considered normal for the society
- Savings activity: Accumulating savings, pensions entitlements or owning property

In summary, social inclusion refers to a process of re-integration and a striving for renewed participation in response to social exclusion mechanisms, whereas social exclusion is about identifying the processes that cause deprivation and exclusion, social inclusion consists of addressing these issues (Notley & Foth, 2008; Wright & Wadhwa, 2010).

Bianchi et al. (2006, p.23) stress the importance of **inclusion as a policy objective**: "Inclusion comes with important economic, social and political benefits that further underscore its importance as a policy objective. Put simply, societal exclusion is very expensive, economically counterproductive and lays a heavy social and political burden on society, particularly where our suggested priority areas for e-Inclusion are concerned." And, priority should be given to those who find themselves in the most precarious and vulnerable situation: "Giving priority to the most disadvantaged and vulnerable groups and addressing the hurdles they face for equitable participation in public life, is not a contradiction of the equality principle, but is, in fact, a precondition for its realization" (Bianchi et al., 2006, p.23).

1.1.2. Conceptualizing e-inclusion: a multitude of approaches

"The expression 'digital inclusion' combines defining terms such as 'digital divide' and 'social inclusion', together with the assumptions, ideologies and value systems they carry" (Steyn & Johanson, 2011, p.45). Though the concepts of digital inclusion and e-inclusion can be considered as synonyms, different understandings of both concepts are brought forward depending on the stakeholders involved (Steyn & Johanson, 2011).

In European policy documents such as the Riga Declaration the term e-Inclusion is used and proposed as a twofold concept that refers both to inclusive ICT and to the use of ICT to achieve wider inclusion objectives (Wright & Wadhwa, 2010). This duality is also present in

the definition of **e-Inclusion** proposed by the eEurope Advisory Group (2005, p.7): "e-Inclusion refers to the effective participation of individuals and communities in all dimensions of the knowledge-based society and economy through their access to ICT, made possible by the removal of access and accessibility barriers, and effectively enabled by the willingness and ability to reap social benefits from such access. Further, e-Inclusion refers to the degree to which ICT contribute to equalizing and promoting participation in society at all levels (i.e. social relationships, work, culture, political participation, etc.)."

Bianchi et al. (2006, p.1) bring **a more work-oriented definition of e-Inclusion** to the fore that stresses the potential role of governments, third-sector organizations and other stakeholders: "e-Inclusion refers to all efforts by the public and private sector, civil society and the technology community devoted to developing and using ICT to address issues of societal exclusion in any dimension; creating new opportunities for inclusive empowerment and development through ICT, and preventing new ICT-induced gaps from emerging."

The eEurope Advisory Group (2005, p.7) highlights that a definition of **e-inclusion should also refer to the importance of social inclusion, empowerment and participation** of individuals and communities: "e-Inclusion is basically social inclusion in a knowledge society. Therefore, beyond access to ICT tools and services, beyond even digital literacy, a definition of e-Inclusion should focus on people's empowerment and participation in the knowledge society and economy: Skills and competences (both ICT-related and regarding new ways of working using ICT), awareness and willingness, social capital and the means to grow it are also key factors of e-Inclusion."

Wright & Wadhwa (2010) confirm the above emphasis on inclusion and empowerment and state that a definition of e-inclusion should entail at least the following three dimensions of social inclusion: digital disadvantages, digital opportunities and digital empowerment. According to the Framework for Digitally Inclusive Communities developed and proposed by IMLS, TASCHA, & IMCA (2011) e-inclusion means that all members of a community understand the benefits of ICT, have equitable and affordable access to ICT and have the capabilities to take advantage of the different opportunities of ICT. In the UK the Digital Inclusion Team[1] stresses the importance of a **strategic use of digital technologies** in their definition of digital inclusion: "The use of technology either directly or indirectly to improve the lives and life chances of disadvantaged people and the places in which they live" (Notley & Foth, 2008, p.11).

The same diversity in approaches can be found when considering the **priorities of an e-inclusion framework**. Many references are made to address the different ICT-related barriers that exist at an individual level and hence, cause inequalities at the level of access, motivation, skills and usage of digital technologies. Delivering access is put to the fore as a first priority (Brants & Frissen, 2003). Additionally, the availability of relevant content and services and opportunities for the attainment of skills are identified as important enablers for e-inclusion (Communities and Local Government, 2008b; IMLS , TASCHA, & IMCA, 2011; Teles & Joia, 2011).

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[1] Delivery Innovation Team (2006-2011), Programme Summary and Final Report commissioned by the City of London. Available at: https://files.pbworks.com/download/WcTEwEpZ7r/digitalinclusion/38362339/Delivery%20Innovation%20Team%20Final%20Report.pdf

Bradbook and Fisher (2004) refer to the "5 Cs" of digital inclusion: "Connectivity (cf. Access); Capability (cf. Skills); Content; Confidence (cf. Self-efficacy); and Continuity (cf. embedding in everyday life)." The Framework for Digitally Inclusive Communities developed and proposed by IMLS, TASCHA, & IMCA (2011) builds upon five foundational principles: (1) Availability and affordability; (2) Public access; (3) Access for people with disabilities; (4) Adoption and digital literacy; and (5) Consumer education and protection. The framework also refers to six targeted principles: (1) Education; (2) Economic and workforce development; (3) Civic engagement; (4) Public safety and emergency services; (5) Health care; and (6) Quality of life. Overall, research by the Department of Communities and Local Government (2008c, p.6) indicates that most international strategies for digital inclusion can be brought back to five key goals: "(1) Accessibility for all; (2) Digital equality; (3) Literacy and digital competence; (4) Technology to enhance independence and ageing; and (5) Technology for inclusion."

In this report, the decision was made to use the term e-inclusion instead of digital inclusion, because of the consistent use of the term e-inclusion in European policy documents. In summary, e-inclusion refers all efforts by the public and private sector; civil society and the technology community to ensure the full participation of individuals and communities in today's knowledge-based society by (1) addressing the various inequalities that occur at the level of access, motivation, skills and usage related to ICT; and by (2) establishing policies and programs that build upon the use of ICT to achieve wider inclusion objectives.

1.1.3. e-inclusion: the potential impact of digital technologies

Currently, both policy and research subscribe to the idea of **achieving social inclusion through e-inclusion** and the use of digital technologies (Steyn & Johanson, 2011). As Brants & Frissen (2003, p.4) indicate: "Optimists claim that ICT function as a new means of overcoming traditional forms of exclusion and inequality, referring to the Internet as an enabling technology leading to greater social justice." Steyn & Johanson (2011) refer to this view as the so called "e-inclusion's panacea" in which digital technologies are considered to be a solution for all problems related to social exclusion. Examples of this view are numerous and highly diverse. According to Haché & Cullen (2010, p.21) the following positive effects can be achieved via the usage of digital technologies such as digital games to enhance social inclusion:

1. Improved numeracy and literacy
2. Development of digital literacy
3. Supporting team-working
4. Reducing stigmatisation
5. Reducing "gang antagonism" and gang feuds
6. Increased confidence and self esteem
7. Increasing motivation to learn more
8. Reduced marginalisation
9. Supporting active citizenship and expanding young people's horizons and their sense of their capabilities

Notley & Foth (2008) mention the positive impact of the use of digital technologies on a community's collective and individual social capital. Research commissioned by the Department of Communities and Local Government (2008a, p.10) identifies four types of benefits: (1) Developing social and employment skills: gaining qualification, keeping in touch; (2) Building confidence and ambition: gaining a sense of achievement; (3) Practical

tools: job searching, shopping online; and (4) Independence: being able to do more yourself even if you face physical or other barriers. In addition, they found that, for elderly people, digital tools could help them remain independent, overcome isolation and increase and diversify in-house leisure activities (Communities and Local Government, 2008c). According to Bianchi et al. (2006, p.3) similar beliefs should be integrated in an e-Inclusion policy agenda: "The key priority areas of health, education, employment and equitable participation in collective governance, the analysis of the potential of ICT for inclusion points at the following themes as relevant for a potential e-Inclusion policy agenda":

1. Digital tools to support individuals´ access to the labour market (cf. eLabour)
2. Digital tools to support equitable participation in public and political life (cf. eEngagement, eDemocracy, eGovernment)
3. Digital tools to support life-long learning (cf. eLearning)
4. Digital tools to minimize individual impairments caused by ageing, disability and disease (cf. eHealth and ICT for independent living and active ageing)

However, the majority of the expectations with regard to the **potential added value of digital technologies for social inclusion remain largely hypothetical** as figures on effective impact are currently lacking. Though digital games carry much potential for the inclusion and empowerment of at-risk groups (see 2.5.3), research is lacking on the overall gaming behaviour and media usage patterns of at-risk groups (Haché and Cullen, 2010; Ortiz, 2009). Acquiring qualitative and more detailed data would enable more appropriate policy interventions for the implementation of digital games within at-risk communities (Haché and Cullen, 2010).

1.1.4. Drawbacks of e-inclusion policies

E-inclusion policies are put forward as the ideal way for achieving the renewed participation and social inclusion of at-risk groups. However, as Tsatsou (2011, p.326) indicates: "E-inclusion is not a solution to the **multi-dimensional problem of social exclusion** and should be seen as a facilitator or result of the dialogue and interdependencies between socio-cultural traits of and policy and regulatory practices in the information society." Mehra, Merkel and Bishop (2004) stress that the true empowerment of at-risk groups can never be achieved without looking simultaneously at their use of the Internet and the barriers and difficulties of their social realities. Developing suited e-inclusion policies requires a continuous re-examination of the social dynamics of at-risk groups and their interactions with digital technologies.

Helsper (2008) confirms the need to review exclusion mechanisms repeatedly because **digital exclusion is not a fixed situation**. Furthermore, Helsper (2008, p.27) emphasizes the role of lifestyles and life stages: "People tend to 'dip in and out' of technologies such as the Internet, depending on their everyday circumstances. This means that at certain points in their lives they are digitally included and at others they are excluded." According to Haché & Centeno (2011, p.33) this implies that "eInclusion goals cannot be achieved in a straight line but in a succession of separate steps that might be taken by citizens depending on their characteristics, "life moments" and the options and resources available to them."

One of the main prerequisites for successful e-inclusion policies is the **intrinsic motivation** to use digital technologies and become digitally and socially included. Too often, e-inclusion policies rely on a positive attitude amongst currently disengaged groups

and hence, chances are real that e-inclusion policies do not reach their objectives (Sinclair & Bramley, 2010). In this regard, Hüsing and Selhofer (2004, p.22) claims that the so-called Matthew effect, meaning advantaged groups will benefit more and easier than disadvantaged groups, might come into play: "There is legitimate concern that this increased information opportunity will disproportionately be used by those who are already advantaged in society, rather than narrowing the gap(s) between them and disadvantaged groups of society." To avoid this and enable the inclusion of at-risk groups, Mehra, Merkel and Bishop (2004, p.799) add that the effective empowerment of at-risk groups calls for "the active participation of minority and marginalized users based on a reconfiguration of relationships surrounding all aspects of internet access, training, content development and system design and evaluation." Hence it is important that e-inclusion programs build upon a highly individualized approach instead of a 'one solution fits all' approach because the needs of the different disadvantaged groups and the benefits digital technologies might bring them are not necessarily the same for all (Communities and Local Government, 2008b).

Another critique regarding e-inclusion policies is that the approach of using ICT for inclusion goals sounds promising in theory, but appears to be much more complex in reality. Several scholars indicate that digital inequalities often exist alongside other social inequalities and traditional forms of deprivation such as civic engagement, political participation, education or health care (Gilbert, 2010; Livingstone & Helsper, 2007). Moreover, Warren (2007, p. 379) claims that **digital and social inequalities are characterized by a vicious circle** that maintains and reinforces the unequal life circumstances of the most vulnerable segments of the population: "Social exclusion leads to digital exclusion, which in turn perpetuates and exacerbates that social exclusion."

Gorski (2008, p.358) highlights the fact that **digital technologies might lead to an aggravation of social inequalities**: "What is clear is that these technologies are not, in and of themselves, the great equalizers. In fact, as it stands, they more often seem to be tools for further embedding existing inequities—existing gaps of access to opportunity." And additionally, Witte & Mannon (2010, p.3) make clear that due to digital technologies new inequalities might arise: "In its current form, then, the Internet is a paradox of twenty-first century American life, at once an emblem of a free and open society and an active reproducer and possible accelerator of social inequality."

These different drawbacks of e-inclusion policies imply that a well thought out and project-based approach for the use of digital games for empowerment and inclusion is needed (see 2.5.3). Such an approach should be developed in collaboration with third sector organizations and ideally use collaborative and participatory approaches in order to ensure that the project and its objectives are in line with the actual game culture, the digital habits and the societal needs of the targeted groups (Royle & Colfer, 2010; Steinkuehler et al., 2009).

1.1.5. A multi-stakeholder approach for a multi-faceted concept

The fact that digital and social exclusion are multi-faceted phenomena indicates that **e-inclusion policy should be aligned with a range of other policies** such as social wellbeing, health, education and employment (Bianchi et al., 2006; Communities and Local Government, 2008a). In addition, e-inclusion policies should combine a bottom-up and top-down approach (Heeley & Damodaran, 2009; Sinclair & Bramley, 2010). According to Bianchi et al. (2006, p.61) this implies that e-inclusion demands for a **multi-stakeholder**

approach: "e-Inclusion is a multi-faceted concept. It is relevant for activities in the social, economic, health, education and technology policy domains. It engages both policy practitioners from the public sector, as well as stakeholders from the technology R&D community, the private sector and civil society. It also requires concerted efforts at all levels - international and European, as well as national, regional and local."

Each of the stakeholders involved should take leadership in their domain and act as a catalyst for the implementation of e-inclusion actions (IMLS, TASCHA, & IMCA, 2011). Governments for example, should take a leading role in the development of sustainable, forward-looking strategies of inclusion and empowerment. Private companies are key actors for the development, innovation and diffusion of infrastructure, tools, applications and content. Third sector organizations are crucial partners for the implementation of community-based learning opportunities and public Internet access points to the public at large (Heeley & Damodaran, 2009). Moreover, third sector organizations are the best possible stakeholders through which at-risk groups can easily be reached and as such, make these groups acquainted with the potential societal benefits of digital technologies (Communities and Local Government, 2008b). Additionally, education and training institutions, both formal and informal, are key stakeholders for the acquisition and attainment of digital skills (Bianchi et al., 2006; Haché & Centeno, 2011). Academics also have a role to play and should initially focus on the gathering of empirical evidence of the impact of e-inclusion policies and as such, enable the identification of the main drivers for a successful e-inclusion strategy. But research can also play an important role in unravelling the complex relation between social and digital exclusion and digital and social inclusion, and hence, improve the comprehension of the multifaceted barriers encountered by at-risk groups.

Defining inclusion

Inclusion can refer both to social as well as digital aspects. It can be conceived both as a process, an outcome and a strategic policy goal. This is reflected in the many definitions of the terms social inclusion, digital inclusion and e-inclusion. Throughout the report, we will follow these definitions:

Social inclusion: Socio-economic processes shaping full participation in society (i.e. production, political, social, consumption and savings activity – Selwyn, 2003) or the outcome of these processes.

e-Inclusion entails socio-economic processes shaping access to digital technologies and related services, awareness of its opportunities and the capability, willingness and confidence to use digital technologies in every-day life. E-inclusion can refer both to inclusive digital tools as well as use of digital tools to achieve broader inclusion and empowerment goals. We use the term e-inclusion to refer to (policy-driven) initiatives that attempt to counter social exclusion, promote social inclusion and empower people through digital inclusion.

Social exclusion refers to a complex and multi-faceted process that is caused by dynamics that are often intertwined and as such strengthen each other and often lead to simultaneous deprivation at the level of work, education, living conditions, income, social security, daily resources or health. It prevents the full participation in society of individuals or communities.

Promoting social inclusion through e-inclusion

In subscribing to the idea of achieving social inclusion through digital inclusion, policy makers believe that use of digital technologies can overcome all kinds of problems related to social exclusion. Digital technologies are expected to enhance various aspects of education and employability, health and well-being, civic participation and community building.

Some caveats are in order, however, when considering the benefits of digital technologies for inclusion:

1. Evidence: There is a lack of evidence on actual impact of digital technologies on social inclusion.
2. Multi-dimensionality: The multi-dimensional nature of social inclusion and exclusion warrant a broader perspective than looking at digital technology use.
3. Dynamic: Social exclusion is not fixed, but changes as people's lives progress, which requires a constant reexamination of people's needs.
4. Motivation: People may or may not be interested in using digital tools. We should not assume an intrinsic motivation to engage in technology-related activities, nor believe that a single solution will appeal to all.
5. Vicious circle: Social inequalities tend to exist alongside digital inequalities reinforcing each other. Introducing digital technologies may in certain cases aggravate social exclusion.

These considerations call for an approach in which e-inclusion policy is considered alongside other policies and multiple stakeholders are involved, each with a particular role:

1. Government: Development of sustainable, forward-looking strategies of inclusion and empowerment
2. Private companies: Development, innovation and diffusion of infrastructure, tools, applications and content
3. Third sector: Implementation of community-based learning opportunities, public Internet access points to the public at large, outreach to at-risk groups, making them aware of potential benefits of digital technologies
4. Education and training institutions: Formally or informally supporting acquirement and attainment of digital skills
5. Academic research: Policy-driven research considering impact of digital inclusion policies and its determinants or, more generally, investigation of the relationship between digital and social inclusion and exclusion.

It is reasonable to assume that to some extent these caveats and need for multi-stakeholder approach hold for inclusion by using games as well.

1.2. Empowerment

In what follows, we elaborate on the concept of empowerment and how empowerment can be obtained through the use of digital media. We discuss how empowerment, similar to social inclusion, has been interpreted, both as a state and a process (Section 1.2.1). We clarify that e-inclusion initiatives actively pursue empowerment of at-risk groups (Section 1.2.2). We conclude with a discussion of the fact that such initiatives are often faced with an interesting paradox: does empowering people also mean giving them the choice not to participate (Section 1.2.3).

1.2.1. Understanding empowerment

A definition of empowerment is not straightforward since it has different meanings depending on the context; a socio-cultural compared to a political context or an individual compared to a collective context (Narayan, Stern, Nankani, Page, & Jorgensen, 2002). Most of the literature links the notion of **empowerment** to a process of **regaining control**: "Empowerment was defined as processes whereby individuals achieve increasing control of various aspects of their lives and participate in the community with dignity" (Lord & Hutchison, 1993, p.4). As such, the concept of empowerment is also used in the sense of **enablement**: "Enabling people to do what is important to them, and enabling people to grow as competent subjects who have control over their lives and surroundings" (Makinen, 2006, p.381). Van Regenmortel (2009:22) puts forward three pairs of concepts that represent the core ideas of the notion of empowerment: "(1) **inclusion** and active **citizenship**; (2) the **socialization** of care and the reintegration of individuals into communities; and (3) individual **strength** and shared **responsibility**."

According to Lord & Hutchison (1993), three **levels of empowerment** can be identified, namely the individual level (cf. increasing control over daily life circumstances); the small group level (cf. peer pressure and knowledge exchange); and the community level (cf. utilization of community resources to increase control). Van Regenmortel (2009) confirms the multilevel character of empowerment but refers to only two distinct levels, namely (1) the level of individuals themselves based upon a more psychological approach to empowerment; and (2) the level of communities or other collectives based upon a more socio-political interpretation of empowerment. She emphasizes that these two levels are connected and as such interact with regards to the confinement or the externalization of empowerment. Hence, using the framework of empowerment for addressing social issues avoids thinking in terms of 'blame the victim' or 'blame the system' but brings aspects related to both into account (Van Regenmortel, 2009).

Empowerment is also often seen as a **process of change and development** that consists of four main stages: entry, advancement, incorporation and commitment. The first stage – entry – refers to motivational aspects that need to be present at individual level. The second stage – advancement – in which the motivational aspects to become empowered are elaborated, is strongly influenced by the existence of some kind of mentoring relationship within the immediate community of the individual. The third stage – incorporation – focuses on the development of a growing political consciousness and the willingness to become involved. The final stage – commitment – refers to the effective attainment of empowerment and encompasses the situations in which an individual applies his renewed competencies in his day-to-day life (Lord & Hutchison, 1993). This staged approach also confirms part of the preconditions for empowerment that Van Regenmortel (2009) has identified in her work: (1) interaction, (2) process bound, and (3) autonomy. Van Regenmortel (2009) states that empowerment can never be reached in an isolated individualized manner but is always incorporated in a community-supported process via which individuals are given the opportunity to learn and become empowered by doing. Consequently, there is no one-solution-fits-all approach for empowerment. The process of achieving empowerment always needs to be adapted to the context and the stakeholders and target groups that are involved. This explains why empowerment frameworks acknowledge the added value of inside knowledge and experience and will put forward participation and collaboration as a prerequisite for the development of a suited approach (Van Regenmortel, 2009).

Another way of looking at empowerment and self-empowerment is to take Maslow's Hierarchy of Needs into consideration. Maslow (1943) refers to four hierarchical stages that people seek to fulfill before the fifth stage, actual self-empowerment, can effectively take place. These four stages consist of (1) access to physiological aspects such as air, food or sleep; (2) access to safety measures – e.g. having sufficient social, economic and cultural resources; (3) experience feelings of belonging – e.g. being engaged in relationships, experiencing intimacy or friendship; and (4) possess sufficient self-esteem – e.g. showing the confidence and self-esteem necessary to undertake various rationalized steps to become empowered. This also includes being recognized and valued by others. The fifth stage – self-actualization – is considered as the ultimate phase in which individuals are merely driven by their intrinsic motivation for personal growth and self-deployment.

In summary, empowerment is inherently a **complex concept** that entails both strengths and weaknesses; that focuses on increased control but simultaneously on providing support; that strives for more autonomy of individuals but at the same time emphasizes the importance of unity and social cohesion at community level (Van Regenmortel, 2009).

1.2.2. E-inclusion: Empowerment as an ultimate goal

The notion of e-inclusion is often linked to the concept of digital empowerment. For example Makinen (2006, p.381) interprets **e-inclusion** as follows: "With information technology people gain new abilities and ways to participate and express themselves in a networked society. This can be called digital empowerment, which is not a direct consequence of having and using the technical facilities, but a multi-phased process to gain better networking, communication and cooperation opportunities, and to increase the competence of individuals and communities to act as influential participants in the information society."

According to Heeley & Damodaran (2009) digital empowerment refers to the process of evolving from a novice user to a user that is highly skilled and capable of **using digital tools in a strategic and capital-enhancing way**. Another interpretation of digital empowerment refers to the role of **users as potential co-designers and co-developers**: "Citizens empower citizens to go beyond being 'users and choosers' of technology to become 'makers and shapers of the technologies available to them and the rest of society. In a truly inclusive digital society, citizens need to be "actively engaged in the creation of sociotechnical systems" (Damodaran & Olphert, 2006, p.51). Mehra, Merkel and Bishop (2004) use the notion of Internet empowerment instead and identify this as a process of gaining self-worth and personal empowerment via the use of the Internet, especially amongst at-risk groups.

Increasingly, **empowerment** is put forward **as one of the main goals of e-inclusion**. Selwyn & Facer (2007, p.6) for example state that the focus of e-inclusion is to "enable all individuals to make informed and empowered choices about the use of ICT whilst ensuring these individuals have ready access to the resources required to enable them to act on these choices."

This is reflected in the definition for e-Inclusion proposed by Kaplan in the report of the eEurope Advisory Group (2005, p.7) : "Beyond access to ICT tools and services, beyond even digital literacy, a definition of e-inclusion should focus on people's empowerment and participation in the knowledge society and economy." Additionally, Heeley & Damodaran (2009) state that best-practices for e-inclusion address more than the immediate barriers

to digital tools such as access, attitude and skills, but more important, also address digital empowerment, digital opportunity, digital equity and digital excellence. As such, digital technologies are considered as a tool for a divers range of goals such as training, social well-being or economic development. Tsatsou (2011) additionally states that e-inclusion is a prerequisite for empowerment. Without being digitally included, individuals cannot be or become empowered.

1.2.3. Empowered choices versus self-exclusion: the e-inclusion paradox

Empowerment aims towards an increased control over life circumstances: increasing one's authority and control over resources and decisions that affect one's life. Two important factors can increase this control: assets and capabilities. **Assets** consist of material assets such as housing and thus refer to material goods. **Capabilities** refer to enabling people to increase their wellbeing by using their assets in different ways.

An important factor in this enabling is **freedom of choice** (Sen, 1993; Narayan et al., 2002). This means that e-inclusion and empowerment strategies "need to respect the diversity of ICT options and the different technology preferences and choices that different stakeholders might wish to express. Some user groups are more familiar with mobile phones and might find it more convenient to use them. Others are more inclined to use the Internet and some might opt to do without new ICT altogether and use conventional tools to interact with public authorities or take part in civic life instead. Respect for different ICT choices needs to be built into e-Inclusion programmes as far as possible" (Bianchi et al., 2006, p.19).

Helsper (2008) refers to the notion of **digital choice** and defines this as a situation in which individuals choose not to use technologies even though they have the capabilities to do so. Hence, enabling individuals to make informed and free choices implies they may also choose to exclude themselves: "Actual use is not necessarily the outcome of creating access, as non-use is not by definition problematic; exclusion can be a voluntary and conscious strategy" (Brants & Frissen, 2003, p.16). Whether this self-exclusion is a desirable outcome of e-inclusion is an important point of discussion that raises new ethical questions: "Should these self-excluded citizens be badgered and subsidised until they change their mind?" (Wright & Wadhwa, 2010, p.151). Especially, since recent empirical research indicates that self-excluded users are predominantly older people living in poverty (Wright & Wadhwa, 2010).

Defining empowerment

Similar to inclusion, empowerment can be understood both as a circumstance as well as a process. In addition, it can be considered on multiple levels (i.e. individual, small group, community). In fact, a framework of empowerment situates drivers and barriers in the interplay between the individuals and the system they are part of. Drawing from existing conceptions of empowerment, we conceive it as follows.

Empowerment refers to both the community-supported process of (re)gaining control over the resources and decisions that affect one's life, as well as the outcome of this process. The process encompasses:

1. **Entry**: An individual first becomes motivated to achieve change
2. **Advancement**: The person grows more convinced of the relevance of change
3. **Incorporation**: He or she becomes a more active participant in his or her community
4. **Commitment**: Final attainment of empowerment

Promoting empowerment

Strategies to promote empowerment can consider two important determinants:

1. **Assets**: Material assets such as housing and thus refer to material goods
2. **Capabilities**: Enabling people to increase their well-being by using their assets in different ways

In attempting to support empowerment by providing assets and stimulating capability, through digital inclusion strategies or otherwise, policy-makers may be faced with people's empowered choice to opt out.

Self-exclusion: Social and/or digital exclusion as a voluntary and conscious strategy

The concept of self-exclusion clarifies that although digital inclusion and social inclusion may be related to empowerment (e.g. seeing empowerment as a goal of digital inclusion, considering empowerment as a fundamental aspect of social inclusion), one does not necessarily lead to the other. Whether self-exclusion is a desirable, or acceptable outcome of empowerment as a process is part of an ethical debate.

Note: The specific motivational potential tied to game play, which is relevant in this respect, will be discussed later in the document.

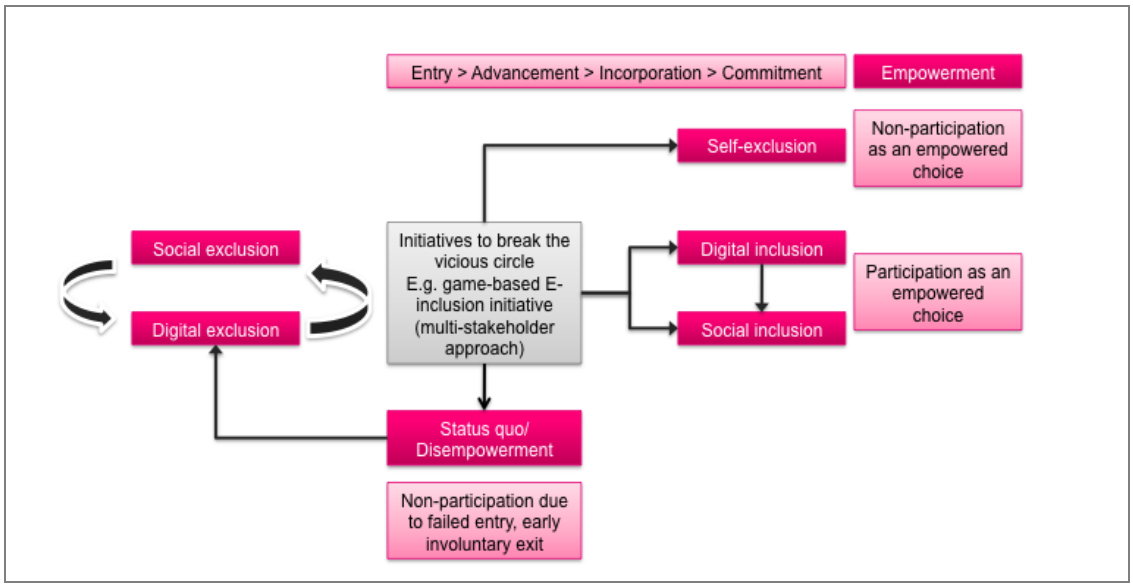

Figure 1. Visualizing our conceptualization of inclusion and empowerment and the relationship between these concepts.

1.3. Gaming and play

In this section, we will delve into key concepts for understanding digital games, play and their evolution until now. We start out with discussing a clear definition of digital games, only to acknowledge that there are many borderline cases such as virtual worlds and simulations, which should not be ignored when considering digital games for empowerment and inclusion (Section 1.3.1). We then address the concept of meaningful play, which has been proposed to underline the tight relationship between digital games, play and sense making (Section 1.3.2). The final part of this section serves to illustrate how the evolution in digital games and in the way they are played has led to a blurring of boundaries between play and non-play illustrated by phenomena such as gamification, pervasive gaming and co-creation (Section 1.3.3).

1.3.1. Digital games

The term **digital game** refers to a multitude of types of games, played on different platforms using digital technologies such as computers, consoles, handheld, and mobile devices (Kerr, 2006). The various platforms on which digital games can be played, becomes apparent on worldwide sales charts such as that issued by Vgchartz (see http://www.vgchartz.com/platforms/). The concept of digital games embraces this technological diversity. In contrast with terms as video games or computer games, it does not refer to a particular device on which a digital game can be played. What binds digital games is that they are fundamentally produced, distributed and exhibited using digital technologies. Digital games are also characterized by diversity in game genres. For an overview and discussion of game genres, see the work of Apperley (2006), for instance. Due to this diversity within the category of digital games, they should be considered as media and not just as one medium (Aarseth, 2001).

Referring to the works of Juul (2003) and of Salen and Zimmerman (2004), De Freitas (2006) notes that there is no single agreed-upon definition of games. She points out that

this process of defining is nevertheless very important. How we define a game will influence its development, and hence conclusions on what can be learned from them and their use in practice.

Knowing this, we propose to start from Juul's definition of games that is based on a review of definitions: "A game is a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable." (Juul, 2003)

As Juul notes, there are certain cases that share some of the defined characteristics but not all. This brings us to cases that are often mentioned in one breath with games: simulations and virtual worlds. According to Juul, open-ended **simulations** are borderline cases because they do not have clear values associated to possible outcomes. This is echoed in the work of Sauvé et al. (2007) who point out that simulations, in contrast with games, are in essence not about winning or losing. In fact, there is usually nothing to indicate whether one has won. They define simulations as a "simplified, dynamic, and accurate model of reality" and argue that games are not necessarily concerned with representing reality, although they can be (the form of simulation games).

Virtual worlds, similar to simulations, tend to not tie values to particular outcomes. Bell (2008) defines **virtual worlds** as "a synchronous, persistent network of people, represented as avatars, facilitated by networked computers". They enable synchronous communication and as such shared activities within a space that instils in users a "sense of geography and terrain". They continue to exist even when a particular user has exited the world. They form an ecosystem of users in which each user's action affects his or her environment (including other users) either directly or indirectly. Their inhabitants are represented by a digital representation that is able to do actions and that is managed by a user in real time. Finally, these worlds, their persistence and complexity, are enabled by computer technology.

The similarity between games, simulations and virtual worlds and the existence of cases on the borderline between these categories has resulted in fuzzy use of the terms. In this report, we will generally refer to digital games, including borderline cases whenever relevant to the goal of promoting empowerment and inclusion. Before we can define what we mean with digital games for empowerment and inclusion, we need to discuss the relationship between games and play.

Defining digital games

Digital games are games produced, distributed and played by means of digital technology. They can be considered as an art and design, technological and research artefact.

Juul (2003) defines **games** as: "a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable."

In the report, we use the term digital games to refer to digital games that apply fully to the above definition as well as borderline cases, in so far as they are relevant to promoting empowerment and inclusion. Borderline cases include:

1. **Simulations**: "simplified, dynamic, and accurate model of reality" (Sauvé et al., 2007)
2. **Virtual worlds**: "a synchronous, persistent network of people, represented as avatars, facilitated by networked computers" (Bell, 2008)

1.3.2. Meaningful play

Fundamental to games, is that players are given some form of agency. As Squire (2006) argues, it is precisely because of this that we can only understand games by considering what players do with games and what meaning they derive from them. In other words, to understand games, we need to look at play.

Salen and Zimmerman (2004) propose the concept of **meaningful play** to illustrate the close relationship between games, play and sense making: "Meaningful play in a game emerges from the relationship between player action and system outcome; it is the process by which a player takes action within the designed system of a game and the system responds to the action. The meaning of an action in a game resides in the relationship between action and outcome." (Salen and Zimmerman, 2004)

Although this definition seems to emphasize meaning as derived from interpreting the rules of the game, the authors point out in their work that meaningful play in fact takes place on three levels: on the level of rules (i.e. treating the rules meaningfully), on the level of play (i.e. giving meaning through one's context-embedded experience) and the level of culture (i.e. mutual shaping of games and culture) (De Schutter, & Vanden Abeele, 2008).

It is important to emphasize that digital games as we defined them earlier are one possible facilitator of meaningful play. Board games, sports, creative materials, etc: contact with each of these resources can give rise to meaningful play.

1.3.3. Blurring boundaries: gamification, pervasive gaming and co-creation

Since the first digital game was presented, game play has undergone a series of changes. Schouten (2011) describes how the introduction of platform games gave a spatial dimension to game play, providing a **game space** "a virtual space in which gamers can join, act and navigate" (p. 6). Consequently, the ability to connect online in massively multiplayer online role-playing games (MMORPGS) provided an **interaction space** "allowing more meaningful play as gamers are able to communicate, collaborate, decide and co-create" (p.6). Finally, with the advent of technologies such as those enabling location tracking and gesture recognition, hybridization is taking place. The boundaries between game and non-game space, world and activities are becoming more blurred.

Two concepts, gamification and pervasive game play, illustrate this hybridization trend. **Gamification** refers to applying game design elements to non-game activities (Deterding, 2011), often with the goal of engaging people more in these activities. In a business context, "gamification is the process of integrating game dynamics (and game mechanics) into a website, business service, online community, content portal, or marketing campaign in order to drive participation and engagement" (Bunchball white paper, 2010, p.2).

A **pervasive game** can be defined as "... a game that has one or more salient features that expand the contractual magic circle of play spatially, temporally or socially. (...) The game no longer takes place in certain times or certain places, and the participants are no longer certain. Pervasive games pervade, blend, and blur the traditional boundaries of game, bleeding from the domain of the game to the domain of the ordinary." (Montola, Stenros, & Waern, 2009). Although, many of them are, pervasive games are not necessarily technology-based. What connects these games is an expansion beyond the conventions of where, when and/or with whom games are typically played (Montola, 2005).

Another blurring of boundaries that can be witnessed is the distinction between game player and creator. Banks and Potss (2010) refer to the increasing participation of media users in production as a phenomenon of **co-creative culture** which "occurs when a non-trivial component of the design, development, production, marketing and distribution of media products proceeds through the direct involvement of consumers or users. (p. 254)". Co-creation in a gaming context includes, for instance, beta-testing where players test the game before a final version comes out, but also forms of game modding such as adapting or building new levels for a given game.

The forms of hybridization discussed above, challenge us to rethink what it means to play a digital game – as rules can be tinkered with and play can take place anywhere, anytime, game play can become quite open-ended - and to consider implications for business (open innovation) and government (community engagement).

Defining meaningful play

Characteristic of games is that players are given some form of agency. Hence, understanding games requires also looking at what players do with the game, how they make sense of it. This is expressed in the concept of meaningful play first introduced by Salen and Zimmerman (2004).

Meaningful play: Meaningful play emerges from the interaction between players and a game. It refers to a mutual shaping process, in which the player actively makes sense of the game and this sense-making activity is structured by the game rules, the immediate context in which the game is played and the cultural backdrop.

Trends in game play

In the evolution of game play, two hybridization trends can be distinguished:

1. Blurring of the boundary between game and non-game space and activities, for example:
    a. **Gamification**: Applying game design elements to non-game activities (see Bunchball white paper, 2010; Deterding, 2011)
    b. **Pervasive games**: Games that expand beyond traditional temporal, spatial and social conventions of play (see Montola, 2005)
2. Blurring of the boundary between game player and creator
    a. **Game co-creation**: Involving people into a non-trivial component of the design, development, production, marketing and distribution of games

This challenges us to rethink what it means to play a digital game – as rules can be tinkered with and play can take place anywhere, anytime, game play can become quite open-ended - and to consider implications for business (open innovation) and government (community engagement).

1.4. Digital games for empowerment and inclusion

Having elaborated on the concepts of inclusion, empowerment and digital games, we will now zoom into how these are related. This begins with a general overview of the rationale for and conceptualization of using digital games as an engaging means to induce change (Section 1.4.1). This is followed by a discussion of the characteristics of digital games (e.g. interactive, motivational, social aspects) that are perceived as particularly suitable for supporting empowerment and inclusion (Section 1.4.2). The acknowledgement of these opportunities also comes with a caveat that digital games are not inclusive per se: not only does engaging with digital games require assets and capabilities that may require support, they also are not always representative of those they seek to empower (Section 1.4.3).

1.4.1. Play with a purpose

In his inaugural lecture, Schouten (2011) points out that play can both be perceived from a non-utilitarian and an utilitarian perspective: play can be a voluntary, fun activity per se but can also be instrumental for purposes such as learning and - as he discusses in his own work - "the (re)construction of social practices, values and identity in post-industrial society" (p.4).

The recognition of this dual nature of play has encouraged various stakeholders to consider the use of digital games as an engaging, entertaining means to induce some form of change (knowledge and skill acquisition, attitudinal, behavioural or social change). In 2002, U.S. military developed America's Army as a recruitment tool. Around the same time, the Serious Games Initiative was founded, which aims to explore how games can be successfully applied in the context of education, training, health and public policy.

Zyda (2005) defines **serious games** as follows: "...a mental contest, played with a computer in accordance with specific rules, that uses entertainment to further government or corporate training, education, health, public policy, and strategic communication objectives." (Zyda, 2005, p. 26)

Persuasive games are related to serious games. They are sometimes considered as a sub-domain within the broader serious gaming domain, that is, games designed to change

attitudes or behaviours of users through persuasion and social influence (Fogg, 2003). Others have used the term persuasive games to refer to games that support the critical interrogation of real-world processes. Bogost (2007), for instance, distinguishes this category from serious games, which he considers to convey a world-view that serves existing power structures (Bogost, 2007).

Before the launch of the Serious Games Initiative, digital games were already being put to use for other purposes. During the 1980's and 90's a series of games were developed with the purpose of education under the umbrella of 'edutainment'. **Edutainment** referred to any kind of education that also entertains in the context of a growing multi-media PC market. However, these games often failed their purpose, offering "drill and practice activities masked with less than entertaining game play" (Van Eck, 2006).

Most serious games aim at facilitating gamers' higher order thinking skills or problem solving skills "using the characteristics to create game play that does not solely use masked drill activities" (Charsky, 2010). According to Michael & Chen serious games extend far beyond teaching facts and memorization, but include all aspects of education such as teaching, training and informing and can aim at all ages (Michael & Chen, 2006). According to Corti, games have the potential to improve training skills and initiatives by using the engaging and motivational components of games, the use of role-play and repeatability in games (Corti, 2006).

Digital Game-based Learning, a concept originally coined by Prensky (2001a), also focuses on the use of games for learning and education. Prensky argues that to effectively reach today's learners we need to speak their language. He calls them 'digital natives', "native speakers" of the digital language of computers, video games and the Internet" (Prensky, 2001b).

Since the start of the Serious Games Initiative, other initiatives have followed suit. One example is the Games For Change initiative (www.gamesforchange.org), founded in 2004, that, as noted in their online mission statement, "facilitates the creation and distribution of social impact games that serve as critical tools in humanitarian and educational efforts". The Games for Health initiative (http://www.gamesforhealth.org), co-founded by the founder of the Serious Games Initiative (Ben Sawyer), started up in the same year and aims – as their website specifies - to connect "health professionals, researchers, and game developers in order to advance the development of health games and game technologies".

De Schutter and Vanden Abeele (2008) have proposed to use the term **meaningful play**, discussed earlier, when talking about games in relation to learning. They argue that unlike the previously discussed concepts, it has a layered character, it is neutral to the hypothesis that commercial games may also support learning outcomes and acknowledges that games can be entertaining and informative at the same time. While these are valid arguments, we do believe we need terms to distinguish between games that have been developed for a purpose beyond entertainment and those that were not. In this report, we will refer to the former category as **special-purpose games**. We will refer to the latter as **commercial off-the-shelf games (COTS).** We will use the term serious games when referring to work in which this specific label was used, but will otherwise avoid the term as it suggests that commercial off-the-shelf games are not to be taken seriously.

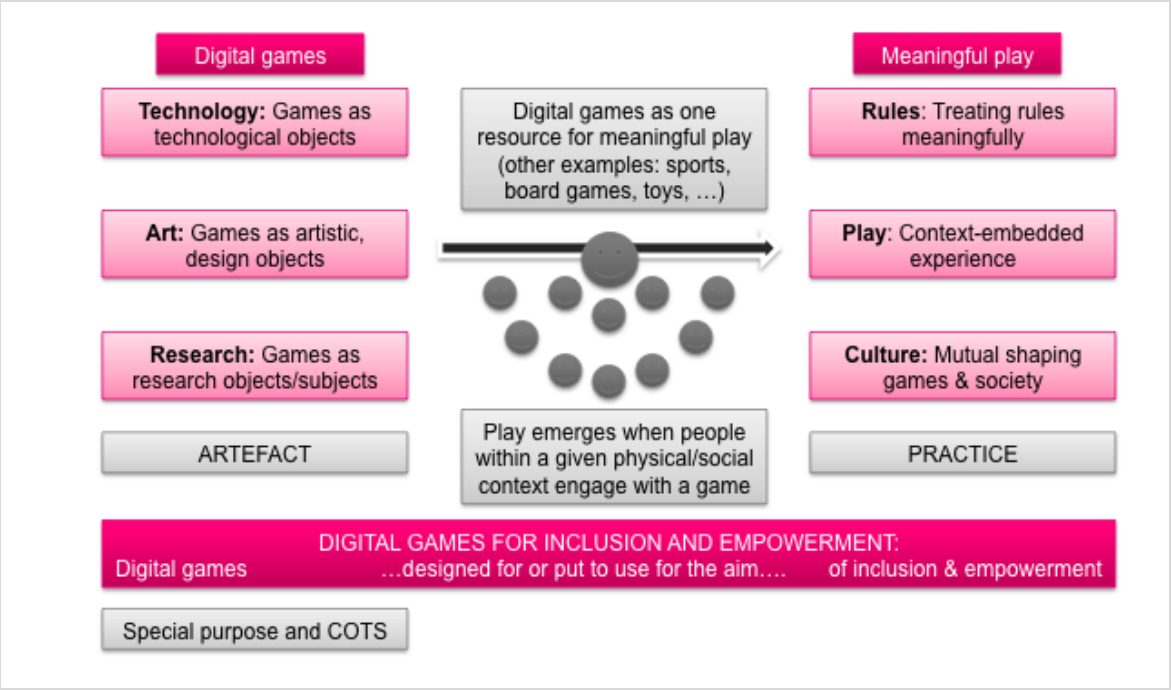

Figure 2. Digital games for inclusion and empowerment through meaningful play.

1.4.2. Learning, participation and empowerment

Electronically supported learning and teaching, also referred to as e-learning, has a relatively long and rich tradition going back to the 1960s. Over the years, different types of systems have been developed to guide or support computer-based and collaborative education and training. In this report, we will only deal with this tradition insofar that is relevant to the specific sub-domain of game-based learning.

De Schutter and Vanden Abeele (2008) concisely describe what makes games such interesting tools for **learning**. First, they are interactive rule-based systems that allow for experimentation and stepping in someone else's shoes in a safe simulation of reality. In this sense, their replayability supports practice and trial-and-error testing. Second, by setting goals, presenting players with challenges, affording control and providing players with compelling sensory experiences games are intrinsically motivating. Educators, caregivers, policy makers and so on hope to harness this power of games in a way that they can motivate people better to change their cognitions, attitudes and actions. Thirdly, games can become the subject of social interaction and communities. This social factor can both contribute to players' motivation (Dickey, 2007) as well as to empowerment of players and those who seek to accommodate game play (Rao, 2008; Järvinen, 2009). While all games may become part of a community of practice, games that technically support spontaneous in-game collaboration and community formation (such as social network games) may be particularly suitable in this respect.

The relationship between the social component of digital game play, learning, and inclusion and empowerment becomes particularly evident in the concept of **participatory culture** (Jenkins et al., 2006b). Jenkins and colleagues (2006b, p.3) discuss how today's youngsters are increasingly involved in a culture "with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe their contributions

matter, and feel some degree of social connection with one another (at the least they care what other people think about what they have created)."

Game play is inherently part of this participatory culture and seems particularly fit to facilitate empowerment: "Empowerment comes from making meaningful decisions within a real civic context: we learn the skills of citizenship by becoming political actors and gradually coming to understand the choices we make in political terms. Today's children learn through play the skills they will apply to more serious tasks later. The challenge is how to connect decisions in the context of our everyday lives with the decisions made at local, state, or national levels. The step from watching television news and acting politically seems greater than the transition from being a political actor in a game world to acting politically in the "real world." (Jenkins et al., 2006b, p.10).

Jenkins and colleagues (2006b) caution us against seeing game play merely as a tool to reach empowerment. They emphasize that play is in fact also a skill that has to be mastered to become a confident member of participatory culture. It is in the encouragement and the nurturing of this and other new **media literacy** skills (see call out box) that people, even young people who grew up with new media, can use support.

Call out 1: New media literacies (Jenkins et al. 2006b)

1. **Play**: The capacity to experiment with one's surroundings as a form of problem-solving
2. **Performance**: The ability to adopt alternative identities for the purpose of improvisation and discovery
3. **Simulation**: The ability to interpret and construct dynamic models of real-world processes
4. **Appropriation**: The ability to meaningfully sample and remix media content
5. **Multi-tasking**: The ability to scan one's environment and shift focus as needed to salient details
6. **Distributed cognition:** The ability to interact meaningfully with tools that expand mental capacities
7. **Collective intelligence:** The ability to pool knowledge and compare notes with others toward a common goal
8. **Judgment:** The ability to evaluate the reliability and credibility of different information sources
9. **Transmedia navigation**: The ability to follow the flow of stories and information across multiple modalities
10. **Networking:** The ability to search for, synthesize, and disseminate information
11. **Negotiation:** The ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms.

1.4.3. Representation by age, gender and ethnicity

To what extent games can promote empowerment and inclusion in society, may depend on the extent to which they are accessible to, are used by and are representative of those they seek to empower.

According to social identity theory (Tajfel, 1978), people compare representations of groups they belong to, to representations of other groups. This comparison serves as a measure for the weight these groups carry in society. When representations of certain groups in society are scarce or even absent, this could lead to a feeling of unimportance and powerlessness (Mastro & Behm-Marowitz, 2005).

Several studies concerning games and identification with game characters have shown that enjoyment in playing increases when identification with the game character increases. Moreover, the effects of playing games can be mediated through identification with game characters: identification can stimulate the copying of behaviour exercised by the game character (Mcdonald & Kim, 2001; Konijn et al., 2007). There are two types of identification that can be found in media: similarity and wishful identification.

Similarity identification refers to the identification with characters because of similarity between salient characteristics. However, identification does not necessarily have to be a result of similarities between the gamer and the character, but can also be a result of the 'liking' of a certain character. **Wishful identification** is then a more appropriate form of identification, which refers to the desire to be more like the character, to dispose of certain characteristics the media character has, which the gamer does not have. According to Konijn et al. (2007) the concept of wishful identification will stimulate learning through observation, because it provides a glimpse of "what if," and these glimpses are powerful predictors of future behaviour (Cohen, 2001, p. 260). However, several factors need to be taken into account when one wants to stimulate vicarious learning. Physical features such as gender and race can facilitate wishful identification.

Therefore it is important to study how different societal groups are represented in games, because they could have an impact on enjoyment in playing the game and on the effectiveness of the use of games for empowerment and inclusion.

Digital games for empowerment and inclusion

The recognition of the dual nature of play (i.e. instrumental and fun) has encouraged various stakeholders to consider the use of digital games as an engaging, entertaining means to induce some form of change (knowledge and skill acquisition, attitudinal, behavioral or social change).

Different concepts have been introduced to refer to this practice and the games underlying it, including the term serious games. Although widely used, this term is problematic in the sense that it implies that commercial games cannot support learning outcomes. Throughout the report, we will take a neutral stance, by using the terms:

1. **Special-purpose games** (instead of serious games): Games developed for a particular purpose beyond entertainment (in this case: empowerment and inclusion)
2. **Commercial off-the-shelf games**: Games developed for general entertainment

We acknowledge the possibility that **meaningful play** can emerge from engagement with both types of games. The characteristics of games and their role in participatory culture make them interesting tools for empowerment and inclusion through the learning and participation that they facilitate. However, two related caveats are in order:

1. **New media literacy**: We need to be aware that digital game play is in itself a skill that requires mastery and in which people can use support
2. **Representation and identification**: We need to consider to what extent those we seek to empower or include are already playing games, whether they feel represented in the game and are able to identify with game characters. These factors will likely influence the success of game-based initiatives.

2. Insights from research and practice

The aim of this section is to provide an overview of the available knowledge relevant to the field of digital games for empowerment and inclusion. It aims to highlight insights found in the available scientific literature and commercial and research project reports and identify knowledge gaps. The scope of this section is not restricted to research and projects that deal with empowerment and inclusion per se but also looks into related fields, which may be relevant to such initiatives.

The section is divided thematically in seven subsections

- **Learning and participation in games**: Seeing learning and participation are pathways to inclusion and empowerment, we distinguish and illustrate three broad approaches to promoting learning and participation with digital games in the first subsection.
- **Motivation to play, participate and learn**: In the second subsection, we situate the concept of motivation and clarify how both intrinsic and extrinsic motivation may be relevant for those seeking to harness the motivational power of games. We also discuss how digital game play can trigger people's interest in activities external to the game.
- **Application domains**: Digital games, both non-commercial and commercial, are being put to use for a variety of purposes other than entertainment across a variety of sectors. In the third subsection, we highlight the different application domains and illustrate them with examples.
- **From game development to reaching the audience**: Scenarios of how to go from the development of DGEI to the market and the stakeholders involved in this process are far from established. In this subsection, we argue for and propose an eco-systemic view of the DGEI market and discuss the challenges that stakeholders face in reaching it.
- **Adoption, implementation and usage**: The availability of DGEI does not imply that these will be adopted and used. In this subsection, we first look at the general adoption of special-purpose games. We then consider drivers and barriers for adoption by at-risk groups and by intermediary organizations.
- **Exploring the impact of digital games:** Although still limited, an increasing number of studies points towards strategies for effectively using digital games in areas such as civic engagement, health and well-being, education and employment. Here, we highlight some of these studies, discuss their methodology and impact assessment on project-level.
- **Knowledge gaps**: Based on our exploratory review, we identify a number of knowledge gaps that require further investigation.

2.1. Learning and participation in games: 3 approaches

Since the early 1960s digital games have developed from a technological experiment into a media subculture and in recent decades into a mainstream media industry. The digital game industry has become a major segment of the home entertainment industry, its turnover surpassing that of the recorded music industry and approaching that of film.

> "According to PricewaterhouseCoopers (PWC), a consulting firm, the global video game market was worth over $56 billion dollars year. That is more than twice the

size of the recorded-music industry, nearly a quarter more than the magazine business and about three-fifths the size of the film industry, counting DVD sales as well as box-office receipts." (Economist Special Report: Video Games, December 11th, 2011, p. 1)

Whilst the large majority of digital games is aimed at and consumed for entertainment, a growing number is being created and/or played for other purposes. These goals include transferring knowledge, teaching skills and raising awareness concerning certain topics (Zyda, 2005). Sometimes so-called commercial off-the-shelf games (COTS) for entertainment are used in this context but more often special-purpose games are created, which are sometimes referred to as 'serious games' (Zyda, 2005: Michael & Chen, 2006).

As mentioned previously, there has been some discussion about the term 'serious games'. However, as it is both vague and downplays the value of digital games for entertainment as 'unserious' (Susi, Johannesson & Backlund, 2007), we prefer the terms special-purpose and COTS digital games. These terms allow us to distinguish between games that merely aim at entertainment and those that do not without downplaying the importance of the former as either unserious or meaningless.

In what follows, we consider three different ways in which digital games are being used for learning as potential pathways to empowerment and inclusion. **Learning** is hereby not just associated with education or training, but **understood in its broadest possible sense including participatory aspects** (see Call out box 2).

These approaches include:

1. **Special-purpose digital games (DGs):** Digital games developed specifically for learning and participation
2. **COTS DGs**: Learning and participation through COTS digital games that were not specifically developed for this purpose
3. **Digital game co-creation**: Learning and participation by making digital games.

Call out 2: Different perspectives on learning

In their review of e-learning theories, frameworks and models, Mayes and De Freitas (2004) differentiate three broad perspectives on learning:

1. **Associationist**: Learning as an activity
2. **Constructivist**: Learning as achieving understanding
3. **Situative**: Learning as a situated activity

According to the **associationist** perspective, learning is an iterative process in which basic cognitive or behavioral units become linked by reinforcement of the right associations through feedback.

From the **constructivist** perspective, learning is considered to be a process in which understanding emerges from interaction between existing structures and new experiences. As experience increases, performance changes from conscious effort to skilled, automated activity. Within this approach, constructivism emphasizes the achievement of understanding through hypothesis testing in dialogue with a guide or mentor (cognitive constructivist substrand) or in interaction with peers (socially mediated constructivist substrand).

Finally, the **situative** perspective emphasises the role of the social and cultural context in which the learning is embedded. It considers knowledge, skills, attitudes and behavior as situated in practice. Mayes and De Freitas (2004) cite the work of Barab and Duffy (1999) who distinguish two aspects of situated learning. One refers to the relationship between the learning activity and its context (socially mediated constructivism) and the other to the relationship between the learner and other learners (community of practice). From this point of view, **participation** in a community of learners is then considered as a key aspect of learning.

2.1.1. Digital games developed for learning and participation

Digital games developed for learning are geared towards specific outcomes. Indeed, learning is often clarified by the outcomes that are generated in the process (Gagne, 1984; Kraiger, Ford & Salas, 1993) which tend to be subdivided in three categories:

1. Knowledge transfer
2. Skill acquisition
3. Attitudinal and behavioural change

Before we discuss these outcomes and examples of games that have targeted them – adding also games specifically aiming at increased participation - we begin with a more general discussion of games as designed learning environments and experiences.

DGs as designed learning environments and experiences

Moore & Anderson (1969) state that different kinds of complexity in information are important to structure the environment in which a message is conveyed or skills are developed which in this case is a game space. According to Moore & Anderson, four principles are important to maximize the 'learning' experience (in this context meaning information/knowledge transfer, skill development and attitudinal and behavioral change). Two principles can be applied in a digital game, although not necessarily for all game genres: the perspectives principle and the personalization principle.

The **perspectives principle** assumes that when a person wants to get to know more about a certain subject, the best way is to approach this subject from different points of view or roles involved in this certain subject. When learning road safety for example, it is

important to be able to approach the subject from the point of view of a pedestrian, a cyclist, a motorist, a bus driver, etc. in order to maximize the knowledge about road safety, skill development, attitudinal change towards road safety and eventually how one acts in traffic.

According to the perspectives principle, a subject can be approached through at least four different roles (Moore & Andersen, 1969). The first is the patient perspective and refers to a role in which one has no control over a certain event and thus has a passive role. A second perspective is that of agent and refers to the role that has caused a certain event and has control, playing an active role. A third perspective is the role of the reciprocator and refers to a role that responds to actions stated by another role. The fourth and last perspective is the role of referee who judges actions with regard to a certain event in an objective manner. Games such as role-playing games incorporate the perspectives principle, allowing players to place themselves in a certain role and approach certain subjects or events from different perspectives.

A second relevant principle is the **personalization principle**, which refers to a twofold concept, consisting of a responsive and a reflexive element. The learning environment must be responsive regarding the actions of the person that is targeted. A responsive environment consists of the following elements: it gives the players a chance to explore things freely, it informs the player about the consequences of their actions chosen and it evolves at the pace of the player. A reflexive learning environment needs to enable people to create a reflexive image of themselves so that they can see themselves as a social subject, from the point of view of others. This is a common practice in sport activities, where trainers will look back at a match with their trainees to learn about their weaknesses and strengths for example.

The personalization principle is also relevant in a game space, because games have the capacity to include a feedback mechanism and let players 'explore' the game world freely. The game space or world also creates the opportunity to let a player reflect about their position vis-à-vis their goals (Clark, 2007). This is a result of the feedback mechanism that can be included in a game space, but also the result of rankings, scores, trial and error and being able to see consequences of certain actions or behaviours (Malone, 1981).

Mayes and De Freitas (2004) point out that that the **overall learning perspective that developers of learning tools adhere to has important consequences**. Each perspective can be mapped on beliefs about what constitute valuable intended outcomes, particular design choices and how learning and empowerment should be assessed (see Table 1). Although they were referring to the design of e-learning environments, we believe their mapping is also useful when considering game-based approaches.

Table 1. Mapping learning perspectives on intended outcomes, design of learning tool and form of assessment based on review by Mayes and De Freitas (2004).

Perspective	Intended outcome	Pedagogical design	Assessment
Associationist	Focus on mastery of mental and behavioural units of increasing complexity	Supporting routines, clear goals and feedback	Assessing knowledge, skill components
Cognitive/Constructivist	Focus on active ownership of learning, task outcomes are discussed with guide/peers	Support for experimentation, guided discovery, interaction, dialogue and reflection (focus on guide)	Assessing broad conceptual understanding
Socially mediated constructivist	Focus on discussion across group of learners	Support for experimentation, guided discovery, interaction, dialogue and reflection (focus on peers)	Assessing broad conceptual understanding
Situative: Community of practice	Focus on real-world practices of formulating and solving realistic problems	Support for identity development, learning in informal context	Peer assessment, assessing participation, authenticity of practice

Knowledge transfer

Games for knowledge transfer aim toward cognitive outcomes. Cognition is generally seen as the knowledge and ideas or opinions a person holds. It refers to the mental activity involved in processes such as studying, thinking, interpreting and problem solving. Cognitive outcomes can consist of three elements: verbal knowledge, knowledge organization and cognitive strategies (Gagne, 1984; Kraiger, Ford & Salas, 1993). **Verbal knowledge** is knowledge that can be transferred by spoken or written language and consists of coded knowledge. It can take the form of declarative, procedural and tacit knowledge. Declarative knowledge answers the question "what?", while procedural knowledge answers the question "how?" (Gagne, 1984; Kraiger, Ford & Salas, 1993). Tacit knowledge is knowledge that cannot explicitly be transferred through written or spoken words (Wagner & Sternberg, 1986). A second element that can be found in cognitive outcomes is **knowledge organization,** which refers to the way in which knowledge is structured in a person's mind. This results in mental models that are formed to solve problems that show certain similarities (Kraiger, Ford & Salas, 1993). A third component of cognitive outcomes are **cognitive strategies** which refer to the use of personal strategies to learn, think, act and guide feelings (Gagne, 1984).

The goals of games for knowledge transfer coincide with cognitive outcomes of learning and can mostly be found in education and training. Educational games integrate knowledge that is related to a curriculum or teaching plan and can thus be embedded in a classroom or course context. **Immune Attack** (Escape Hatch Entertainment) is an example of a game

for knowledge transfer used in education. The aim of this game is to teach pupils how the immune system works (Kelly et al., 2007). Other examples are **Supercharged** (MIT), introducing first year college students in understanding introductory electromagnetic reactions (Mayo, 2007) and **Frequency 1550** (Waag Society), a mobile game teaching Dutch children about the history of Amsterdam (Akkerman, Huizenga & Admiraal, 2009). **Carmen Sandiego** (The Learning Company) is yet another example and teaches children world geography. Social game **Kompany!** (Ouat Entertainment) aims at teaching players vocabulary concerning the business environment, which could be a useful tool for people with another mother tongue to integrate in the business world. Other games for knowledge transfer concerning training are **Get Marketing!** (PIXELearning) to raise awareness about marketing concepts and how it can be applied to the marketing cycle to generate additional sales or **Tactical Iraqi, Pashto, Dari, French and Indonesian** (Alelo) used by the American army to teach their officers local languages when on a mission.

Skill acquisition

Games for skill acquisition primarily aim at skill-based outcomes, whereby skill is primarily associated with **technical and motor skills** (Gagne, 1984). Skill development consists of three phases whereby the first phase, initial skill acquisition, refers to the process in which declarative knowledge is converted into procedural knowledge. The second phase consists of skill compilation, which refers to further practice of the skills acquired in the first phase. In the skill compilation phase performance will gradually contain fewer errors and will become faster. The last phase, skill automaticity refers to being able to perform the skill smoothly and individualizing the skill (Kraiger, Ford & Salas, 1993).

Games for skill acquisition cover subjects such as managerial skills, such as Virtual U (MIT) and Diversité (Daesign). In **Virtual U**, college students are placed in the role of university president to learn management and administrative practices (Charsky, 2010). In **Diversité**, managers practice in taking decisions exclusively based on competences (IDATE, 2012).

Games can also be used sector specific. The games **Patient Rescue** (TruSim) and **Interactive Trauma Training** (Birmingham Serious Games Team) for example, are games developed for medicine students. In Patient Rescue players learn to recognize signs of patient deterioration, use set protocols to assess a patient's condition and intervene effectively. In Interactive Trauma Training, players need to save the life of virtual casualties by making appropriate decisions regarding the treatment of incoming casualties and applying appropriate interventions (Susi, Johannesson & Backlund, 2007). Transmedia Inc. for example developed the **Objection!** Series, which cover courtroom skills in legal education. **The Monkey Wrench Conspiracy** (games2train) aims at engineers and teaches the players how to use new 3-D design software. ForgeFX develops games for safety trainings in different kinds of industries, such as construction and agriculture.

The fact that special-purpose digital games are not per definition inclusive for all was taken into account in the development of the digital games Cardinal Direction and **Skewer in Seoul. These** are research-based mobile games developed to promote spatial skills and executive functioning among visually challenged children. The background, design and evaluation of these games have been discussed in an article by Song, Karimi and Kim (2011) who were part of the team that created the games. The authors contend that while mobile technologies may be specifically useful for learning, the blind tend to be excluded from using these technologies because of their disabilities and/or

socioeconomic condition. The aforementioned games were created to be inclusive; they were auditive games running on low cost mobile devices called TeacherMates™. They were evaluated by blind Malaysian children and found to be easy and enjoyable to use and appeared to stimulate collaboration (once participants were used to it). Impact on spatial skills and executive functioning was unfortunately not reported in this article.

Attitudinal and behavioural change

Games for attitudinal and behavioural change, which include games for raising awareness in certain topics, primarily aim at affective outcomes. These can refer to attitudinal and motivational aspects, both concepts being internal conditions that influence behaviour (Kraiger, Ford & Salas, 1993). Affective outcomes can be an important element in games due to the fact that motivations and attitudes can stimulate a certain behaviour or a certain mode of thought.

Attitudes can thus be influenced in different ways: one can teach a person 'new' attitudes or change existing ones (Gagne, 1984). Attitudinal changes can be an important aspect of certain types of training, in safety regulations for example. Changes in the behaviour of employees with regard to safety procedures can be produced by changing the level of importance that is accorded to safe behaviour in a positive way (Kraiger, Ford & Salas, 1993).

An important element of **motivational change** is self-efficacy, which refers to the perceived performance in a certain activity. The more a person believes they are able to bring a certain task to a successful ending the better he or she will perform at this task (Kraiger, Ford & Salas, 1993). When self-efficacy and thus the belief to succeed is high, people will be more likely to take on that task (Luszczynska, & Schwarzer, 2005). An example is changing one's diet into a healthier one. The motivation for changing an unhealthy behaviour, such as an unhealthy eating pattern, will be influenced by the belief one has to succeed in changing this behaviour. If a person does not believe they can do it, they will not be motivated to change their behaviour (Schwarzer, 2008). Self-efficacy can be positively stimulated by dividing tasks of higher difficulty into smaller, less difficult tasks (Kraiger, Ford & Salas, 1993).

Digital games can also specifically aim to raise awareness concerning certain issues and thus attain certain attitudinal and behavioural changes. Common themes are health, general well-being and societal challenges such as ecology. There are different games for health that cover the subject 'healthy eating' (i.e. **Squire's Quest** by Children Nutrition Research Centre), games for diabetics (**Escape** from Diab by Archimage; Packy & Marlon by WaveQuest), and games for asthma (**Wee Willie Wheezie** by Astra Pharma Canada Inc.; **The Asthma Files** by Nottingham University Hospitals and the University of Nottingham) and cancer patients (**Re-Mission** by HopeLab). Games that cover the theme general well-being are games about subjects such as ecology (**Enercities** by Paladin Studio's, Fate of the World by Red Redemption) and world poverty (**Food Force** by World Food Programme).

Participation

While participation is a fundamental aspect of learning, some digital games have been developed specifically to promote participation in society without targeting specific learning outcomes.

Age invaders is an intergenerational mixed reality digital game for families that was conceptualized and developed in the Singapore-based Mixed Reality Lab (see

http://mixedrealitylab.org/projects/all-projects/age-invaders/). It was created in response to the observation that although older people are participating more in digital games, they rarely play with their family members. while this could benefit family bonding, help bridge the gap between elderly and youth and improve the health and well-being of elderly (Khoo, Merritt, & Cheok, 2008).

As Khoo and colleagues (2009) discuss, Age Invaders was the result of an iterative user-centred design process in which both young and older Singaporean citizens were involved; a population for which it is common that grandparents and grandchildren live together. For the authors it became apparent that the largest challenge was situated in reconciling the different levels of technology skills and acceptance. As a result, a digital game prototype was created that allowed both co-located interaction and remote, physical and virtual interaction. Children and grandparents engage in a playful competition: a co-located laser game that is coordinated remotely by one of the parents.

Khoo, Merritt and Cheok (2008) report that both younger and older players were invited to participate in surveys and focus groups to assess enjoyment and playability of the game. Overall, these results show that both generations enjoyed playing the game, particularly the physical interaction part of it. The benefits discussed above, however, were not assessed.

A strong illustration of learning and participation going hand in hand to promote empowerment is the **Stanford Pocketschool project**. This project focusses on mobile empowerment of underserved, poor communities around the world.[2] Underlying the project is the conviction that empowerment emerges from an interaction process (Kim et al., 2009), Skills and knowledge are not simply delivered to the community, but people are enabled and encouraged to become more active and give back to their community in a sustainable manner. Mobile technology is considered a suitable option to achieve this goal, given that it is becoming ever more widely adopted in developing countries.

Examples of work done within the Stanford project include the development of storytelling and educational gaming applications to empower children and adults living in poor rural communities in Asia, Africa and Latin America (Kim et al., 2008; Kim et al., 2009, Kim et al., 2011). In the case of the children, a non-profit institution called Innovations for Learning took care of manufacturing and distributing a mobile device that the children could use to create stories and share them with the world. In the case of the adults, a mobile farming simulation game was created to promote understanding of micro-credits and stimulate such entrepreneurship in farming. The authors believe that the key to success of these programs in underserved communities lies in the combination of education, infrastructural support with the aim of empowerment in every day life.

2.1.2. Learning and participation through commercial digital games

An alternative to developing games specifically for the purpose of learning is making use of the learning principles that are already incorporated by digital games readily available on the market. In this section, we take a look at the characteristics of COTS games that make them good learning tools, which result in **informal learning** and consider examples of using COTS games both in **formal and non-formal** learning contexts.

[2] http://suseit.stanford.edu/research/project/pocketschool

Call out 3: Informal, formal and non-formal learning

Following the work of (Tissot, 2000, 2004) and Colardyn and Bjørnåvold (2005), Protopsaltis and colleagues (2011) discuss the following conceptualization of informal, formal and non-formal learning, categorizing them on the basis of intention to learn and structure of context:

1. **Informal learning**: Learning without the intention to learn, and without actual planning of learning activities. Sometimes also referred to as experiential or accidental learning
2. **Formal learning**: Learning as an intended and planned activity taking place in an organizec context
3. **Non-formal learning**: Learning as a result of planned general activities in which participants can learn both intentionally and unintentionally.

Informal learning in COTS DGs

In a reflection on his earlier work (Gee, 2003, 2004), Gee (n.d.) argues that good games are those games that incorporate good learning principles. Regardless of whether one agrees with this normative statement, his work presents an interesting, concise yet comprehensive list of learning principles as they can be exhibited by digital games in particular (see Table 1).

Table 2. Learning principles as they can be present in digital games. Based on Gee (n.d.)

Learning principle	Description
Identity	Taking on an identity in the game and thus making an extended commitment of self
Interaction	Interactive relationship between player and game space/world so that actions are situated
Production	Players co-author their experiences, but can also participate in game creation through modification
Risk taking	Low consequences of failure encourages risk taking and exploration
Customization	Customization according to personal learning and play styles
Agency	All previously mentioned principles afford a sense of control and agency
Well-Order problems	Finding solutions to earlier problems helps solving later more complex problems
Challenge and Consolidation	New mastery of problems becomes consolidated through varied repetition
"Just in Time" and "On Demand"	Giving information just when the player needs it, or when he or she requests it.
Situated meanings	Situating the meaning of words in different contexts of use
Pleasantly frustrating	Given many of the previous principles, games manage to keep challenge to a doable level
System thinking	Games encourage players to think about relationships, processes, cause and consequence
Explore, think laterally, rethink goals	Encouraging to think about different alternatives to reach a goal, follow side-tracks
Smart tools and distributed knowledge	Knowledge is distributed across a player, non-player characters and/or other players
Cross-functional tools	Knowing and making use of different resources within the team
Performance before competence	You don't have to know everything about a particular domain before you can participate in it, participation begins immediately

Using COTS DGs in formal and non-formal learning contexts

Commercial-off-the-shelf (COTS) digital games that were developed primarily for entertainment purposes can also be used in formal and non-formal learning contexts. Commercial games are thus not restricted to pure entertainment, but can also be used to present intellectual challenges or content (Charsky & Mims, 2008). An advantage COTS games offer is that they typically contain more seductive graphics and sounds due to higher budgets.

With regard to **formal learning contexts**, COTS games have been used in a classroom context (Wastiau, Kearney, & Van den Berghe, 2009) where they have been shown to be effective in teaching content, skills and problem-solving, when they are needed to make progress in the game (Van Eck, 2006).

Essential to integrating COTS games in education or training is that such games should be part of a 'toolkit'. This refers to the idea that a game should be contextualized as part of an integrated approach to maximize the desired outcome. It should be introduced, concepts should be clarified and a debriefing afterwards is recommended. It has been proposed that transferring skills or knowledge learned in a game to real life situations could be facilitated by the exploration of real world physical environments similar to the game space. For example, in **The Land of Me**, school children explored a riverside in the game space and similarly explored an actual shoreline. The screen-based experience actually encouraged the children to exercise non-screen based activities. The Land of Me fostered their creativity and stimulated the children in using their imagination and thinking skills (MadeInMe, 2012).

Van Eck (2006) provides an overview of the issues that need to be considered when using COTS in the classroom. Everything begins with selecting a suitable game. This is not trivial, as teachers need to be able to locate a game that can be matched to the content they want to convey. Consequently, they need to establish how they will align the game with their teaching activities. Games can function as an advance organizer prior to teaching activities, be a part of the teaching activity in itself or serve to synthesize or assess what was taught afterwards. In addition, teachers need to address what is covered by the game (perhaps in an inaccurate way) and what is not and how they will deal with this and make students aware of it. While making the call to use games in the classroom, they may be faced with various technical, financial, infrastructural and training challenges.

A commercial-off-the-shelf game that has been used in a formal learning context is **Civilization** (MicroProse) for teaching history (Van Eck, 2006; Wastiau, Kearney, & Van den Berghe, 2009) and promoting civic engagement (Squire & Barab, 2004; Kahne, Middaugh & Evans, 2008). **The Sims 2** (EA) was used in a school in Denmark to teach the Danish language to 6th graders (Wastiau, Kearney, & Van den Berghe, 2009), while **SimCity** (EA) has been used to teach civil engineering and urban planning (Van Eck, 2006). The strategy game **Patrician III** (Ascaron entertainment) has been used in a multi-domain context, combining aspects of history, language and information technology (Wastiau, Kearney, & Van den Berghe, 2009).

Farm Frenzy (Big Fish games) has been used in a school in France to teach children methodological skills and to improve players' critical awareness, logical thinking, social skills and confidence in a school context (Wastiau, Kearney, & Van den Berghe, 2009). **Zoo Tycoon** (Microsoft Games Studio) was deployed to teach language by relating the game to other activities such as writing assignments or using the game to teach foreign language

vocabulary. The game has also been used to train economic competences, planning and team work and to teach children about animals and their habitats in biology (Wastiau, Kearney, & Van den Berghe, 2009).

The use of COTS games in **non-formal learning contexts** has so far received less attention than their use in formal learning contexts. In the UK, the Game2Grow project was started up in 2007 to teach intermediaries in community centres to use digital games and gaming technology to re-engage disadvantaged learners. The 2008 Byron Review reports positive feedback from the projects' participants who felt empowered by it. More details on the project are unfortunately hard to come by.

Based on the available literature, it can be concluded that commercial games can not only be used to teach subjects associated with school curricula (biology, history, language learning, etc.), but can also be helpful in training certain skills, such as social skills, planning, economic competences, etc. and in influencing attitudes such as civic engagement, confidence in a classroom context and motivation towards language learning. On the use and benefits of COTS games in non-formal learning contexts far less documentation can be found.

2.1.3. Learning and participation by making digital games

A third way in which games can be related to empowerment is the pathway of learning and participation by creating games. In what follows, we consider this relationship, how this has been approached and the availability of tools that facilitate it.

Making games in relation to empowerment

In work commissioned by the Microsoft (Asia-Pacific) Partners-In-Learning initiative,[3] Lim (2008) cautions that the many opportunities for strong learning engagement tied to digital games (i.e. the possibility to learn in an immersive environment that gives meaning to the learning experience, to learn by doing and being, to create a community of practice) tied to digital games should not be taken for granted. Speaking with regard to digital games created for learning in a classroom context, Lim states, they may fail to be empowering at all: "Although various gaming elements such as narratives, point system, and challenges and levels are integrated into the virtual environment, the environment is often a replication of the existing power relations in the school where teachers and textbooks are the fountain of knowledge and students are empty vessels to be filled with knowledge. Students are not empowered to make decisions and take actions about the political, cultural and social fabric in such environment." (Lim, 2008, p. 1002)

To avoid a 'replication of existing power relationships', Lim argues that target users (in his case, students) could be actively involved in the design of the games intended for them and their peers. While he carefully positions this as an alternative worthwhile considering, Prensky (2008) makes a more bold claim: "Because the next generation of educational games—the games that will truly engage and teach students—is likely to come from the minds of other students, rather than from their teachers. And it is likely that learners will relate to these games, and learn from them, in a way that is not happening today." (Prensky, 2008, p.1004-1005).

[3] " Under this initiative, Microsoft establishes partnerships with ministries of education, national and local government bodies, and other stakeholders to empower students and teachers to realize their full potential, mediated by information and communication technologies" (p. 996, Lim, 2008).

Game making approaches

In constructionist theory, learners are defined as 'builders' of their knowledge. When learners have been given the assignment to design something for the use of others, learning becomes instrumental to a larger intellectual and social goal. This kind of learning stimulates continuous dialogue with the participant's own ideas and the ideas of the intended user. In this way, participants learn by asking questions and actively looking for information. Learning through designing artifacts addresses problem solving skills and planning abilities and emphasizes the importance of learning as a process (Kafai, 1996).

When it comes to problem solving, two approaches can be diversified in constructionist theory: the top-down approach states that the process of problem solving requires the breaking down of one problem into meaningful sub-problems (Papert & Harel, 1991). This approach implies that context, content and structure of design are mapped out from the beginning. The bottom-up approach assumes that problem solving is a conversation with the situation, which implies that design emerges in the process of implementing it (Turkle & Papert, 1991). Design-oriented methods have an underlying assumption of equality among all participating stakeholders such as designers, developers and end users for example (Khaled, 2011).

Call out 4: Constructionism and constructivism (Ackermann, 2001)

The constructionist and constructivist perspectives are fundamentally related. In fact, Papert proposed constructionism as a theory of learning based on the constructivism as put forth by Piaget whom he had worked with.

According to both types of theoretization, knowledge is actively constructed through interaction with the world. Constructionism, however, places a greater emphasis on learning by making; the process of turning one's own ideas into tangible artifacts in a given context using a set of preferred tools.

A study conducted by Kafai (1996) used 'learning through design' by letting 10 children develop a game that concerned fraction learning. The goal was to teach the children design through making games. A main objective in this study was to explore the ways children between the age of 10 and 11 handle a complex design task, which obstacles they bump into and how these obstacles are faced. The software used was Loop Writer. The children were followed during a period of six months, using a combination of qualitative methods to document students' ideas, thoughts and progress in the game development. This study does however not mention what the exact results of this 6 months workshop were. Results only describe which game genres, game worlds and game narratives were put forward by the children, accompanied by a description of game interactions and feedback integrated in the games they had developed. Girls and boys were compared for all these items. Nothing is mentioned about the effectiveness of this manner of teaching or what the children had exactly learned.

Another study used the making of games for empowerment purposes among Danish-Arabic female teenagers (Khaled, 2011). Empowerment in this study refers to empowerment with regards to skill development and expression. A number of 16 girls took part in The Girl Game Workshop and could use games as expressive vehicles for empowerment and promote diversity in game creation. Given the assumption of equality in design-oriented

methods, creating a game seemed an appropriate tool enhancing empowerment amongst teenage girls. The workshop took place in a bilingual Danish-Arabic school, which profiles itself as embodying Islamic values.

The workshop resulted in two game concepts, which were developed in the context of creative and developmental control. Although the girls had the chance to develop something other than the typical girl games they indicated to play, which puts girls in a stereotypical role emphasizing themes like dressing-up, they created concepts that confirmed existing stereotypes. The authors concluded that freedom of expression does not necessarily lead to empowerment. They also state that equality-centric methods may not be the best tool for supporting empowerment for every context, due to the fact that equality 'is a cultural value judgment that is by no means universal' (Khaled, 2011, 419).

When looking beyond content, however, one could say that making games does empower people by providing 'a rich context for learning programming, how to collaborate with others, becoming a member of an affinity group, developing sustained engagement, and more' (Peppler & Kafai, 2007, p.6). These authors observed and interviewed minority youth mostly consisting of high-poverty African American and Hispanic adolescents between the age of 10 and 14 who took part in game production activities at the Computer Clubhouse (South Central Los Angeles). An extensively described case study showed how an Hispanic adolescent who was considered as unsocial by his peers and mentors during, evolved in being widely accepted by his peers and was also considered as a 'mentor' for his peers, due to his impressive work. The activities in the Computer Clubhouse also helped the adolescent in creating future aspirations: attending M.I.T. in order to becoming a professional game designer. The adolescent stated that: '… it teaches how to play games and make games and it helps us figure out our future' (Peppler & Kafai, 2007, p.6). This study consisted of ethnographic field notes, videotaped observations and interviews, which were gathered over a time span of two years.

According to Prensky (2008), letting students take on the role of game designers in the classroom can be approached in two major ways: by involving them in the creation of mini-games that cover small parts of the curriculum or by engaging them in the development of complex course covering games. Prensky considers the first approach more feasible; not only because it is more accessible both for students and teachers, requiring no involvement of professional game companies, but also because mini-games would be more easy to fit into existing teaching practices and constraints. Prensky sees the activity of students designing games for other students in or below their grade already taking place. Whereas professional developers and publishers of educational games have concentrated their efforts on after-school activities where they see fewer constraints, students are creating games that can be used both in school and after-school.

The importance of involving target users in digital game design has also been stressed by other researchers. A team of Singaporean researchers active at the National Institute of Education, Nanyang Technological University in Singapore adopted a participatory approach they call "informant design approach" to create a 3D immersive game for learning Earth science and geography (Kim, Tan, & Kim, 2011). Across a series of five workshops students were involved as informants. By treating students as design partners through the design process, a prototype was created in different iterations to suit learners' needs. However, as the authors emphasize, more closely better meeting learners' needs is not the only possible benefit that comes with this approach; participation in design is also a learning activity in itself. The result of this process was a prototype called Voyage to the Age of the Dinosaurs

that according to the project website (http://isle.lsl.nie.edu.sg/important-documents) has been tested in classrooms.

Some games that are available for public use are the result of participatory design in which people from the target community participated in the design of the game. **Soul Control**, for instance, emerged from a design concept developed by NEET youth who took part in games design course. It addresses gang culture and crime. Nintendo has also used co-creation to create game concepts for certain target groups such as children with learning attention deficit disorder (Walsh, 2009) and sighted children (Willems et al., 2011). Working with the target groups themselves and treating them as experts resulted game concepts for Wii. The Wii game that aims at blind children is designed in such a way that it also can be played by sighted children, in order that blind children do not only have to play games with other blind children, but can interact in game play with their sighted peers. Both blind and sighted children were involved in the co-creation, so that a game concept generated would fit the needs of both blind and sighted children. The game **The discoverer** (gambas) is now available for purchase. The game concepts generated for the ADHD children did however not pass the low-tech prototyping phase.

Other developers have made game design part of the game. **Gamestar Mechanic** (Gamelab), for instance, is a game in which children gradually make progress through game play to a point where they can create their own games and share them with others. The game comes with support for teachers and parents who are interested in engaging (with) children in and through the game.

Game making tools

The process of creating games is increasingly facilitated with the availability of game development tools and toolkits. Many of them are available under open source licenses. Some are intended to be usable by children such as Scratch, Kodu and Sploder. **Scratch** was developed by the Lifelong Kindergarten Group at MIT Media Lab and can be used not only to create games but also to tell interactive stories and make animation movies. **Kodu** is a visual programming language created by Microsoft Research that can be used to program games on PC (for free) and Xbox (for a small fee). Microsoft Research also created a teacher kit illustrating how to use Kodu in the classroom. **Sploder** supports the creation of platform or shooter games. These types of providers often combine the possibility to create online games with the opportunity to share them with others online thereby facilitating an online gaming community.

Some more extensive game development kits also claim to require no previous programming experience, but come with a fee. **GameMaker** is a more elaborate game development toolkit that presents a visual interface for creating MAC and Windows PC games as well as browser games. Although a free version is available, full use of its features comes with a cost. Similarly, **RPG maker**, a program that helps people create their own role playing games on PC, requires no previous programming experience but also requires payment for using the full version.

Other toolkits facilitate programming and expand creative possibilities but do require sufficient coding skills. For instance, **openFrameworks** offers a C++ library that facilitates the creation of all kinds of audiovisual experiments. Another example and also open source is **PyGame** which offers modules to facilitate the creation of games in Python language.

Unity combines a game engine and development environment to support the creation of high-end games for multiple platforms (web, PC/MAC, mobile devices and consoles).

While the previous examples are stand-alone tools, development tools can also come built into or in addition to commercial games. Indeed, some COTS games are constructed with the opportunity of user modification in mind and offer tools to create new levels or customize the game. Examples include **Civilization V** (Firaxis), **The Sims 3** (The Sims Studio), **Minecraft** (Mojang), **Skyrim** (Bethesda Game Studios). Mods, modifications of these games made by players, are widely shared using personal channels, channels provided by the publisher of the particular game or by platforms such as **Steam** where various games, game add-ons and mods can be downloaded but which also stimulates social interaction among players.

Three approaches to using games for empowerment and inclusion

I. Using games developed specially for learning and participation

In this approach, games are specifically designed for the purpose of learning. They can be divided according to their intended outcome:

1. **Knowledge transfer**: Cognitive outcome, which encompasses verbal knowledge, knowledge organization and development of cognitive strategies
2. **Skill acquisition**: Ability to do an activity or job well, which encompasses cognitive, technical and motor components
3. **Attitudinal and behavioral change**: Introduction or change of feelings, opinions regarding a domain, the motivation to change behaviour and actual behavioural change

Crucial in this approach: Awareness of one's perspective on learning. It will determine goal-setting, design choices and mode of assessment.

II. Learning and participation through COTS

This approach starts out from the learning principles that are present in well-designed commercial off-the-shelf games such as customization and low risk of failure (see Table 2 for a full list) and puts these games to use in a learning context (see Call out 3), which can be:

1. Formal learning context
2. Non-formal learning contexts

Most documented examples deal with using COTS games in a formal learning context, specifically to teach on a particular subject in the classroom. Crucial in that case: Selecting a game and approach that is aligned subject matter, curriculum and having technical, financial, infrastructural, pedagogical support.

III. Learning and participation by making games

This approach considers game creation as a pathway to empowerment. It can be positioned within a constructionist perspective (see Call Out 4), which emphasizes the process of turning one's ideas into tangible artifacts by using tools available in the given context. Two alternatives can be distinguished here:

1. Developing a game from scratch for the community one is part of
2. Game adaptation/modification

Crucial in this approach: Game creation and modification are increasingly facilitated with the availability of tool(kit)s. The communities surrounding these practices also provide an important source of support. It is important, however, to acknowledge that enabling people to create games is one form of empowerment, other forms cannot be assumed to follow automatically.

2.2. Motivation to play, participate, learn

Digital games have caught the attention of actors trying to promote some form of change, not merely because they have the potential to facilitate learning and participation, but because they can do so in an engaged and sustained manner. Indeed, digital games are often heralded for being intrinsically motivating.

In what follows, we first broadly situate the concept of motivation as being moved to do an activity, which can be triggered by various incentives (Section 2.2.1). We then describe how

people can be driven to play digital games both by intrinsic and extrinsic motivation, both worthwhile considering for those seeking to harness digital games' motivational power (Section 2.2.2). Finally, we discuss how digital game design and play can also lead to (re-)engagement in activities external to the game itself by addressing how digital games can be part of a game ecology and how game design elements can be transferred to other contexts, i.e. gamification (Section 2.2.3).

2.2.1. Motivating behaviour

Ryan and Deci (2000) begin their review of the concept of motivation by going back to the origin of the word: "To be motivated means *to be moved* to do something. A person who feels no impetus or inspiration to act is thus characterized as unmotivated, whereas someone who is energized or activated toward an end is considered motivated." (p. 54).

According to Bandura's **social cognitive theory**, there are two categories of motivators of behaviour: biologically based and cognitively based motivators. Biologically based motivators consist of physiological conditions. Cognitively based motivators are symbolic presentations of future outcomes that become a guide for behaviour. The expected outcomes are based on **6 basic types of incentives for human behaviour** (Larose & Eastin, 2004). Novelty sensory incentives are built upon senses that are tickled. Aesthetics, novelty and change are important factors here (Bandura, 1986). Social incentives concern rewarding experiences and approval one gets in social interactions (Bandura, 1986, Larose & Eastin, 2004). Monetary incentives are another powerful incentive. Activity incentives motivate certain behaviour when activities are experienced as enjoyable. We will discuss this further below, when dealing with the intrinsic motivations of gaming. Status and power incentives are based upon the desire to attain a high social rank in social groups. Self-evaluative incentives concern how the actor perceives progress and which internal standards are utilized. This feedback about the progress one made, affects future performances (Bandura, 1986).

2.2.2. Drivers for game play

Games often present many of the incentives described by Bandura. Making it possible to add and change elements quickly, explore different environments and can even give the player the ability to influence and change the environment or his character, games encourage people to play and play them again. Some incentives are more prominent in particular genres, others can be found across various genres.

Novelty sensory incentives, for instance, are represented by the game space. Role-playing games offer players the opportunity to explore settings that would otherwise be inaccessible (Raphael et al., 2010). Social incentives can be found in online multiplayer games and communities that are formed in and around gaming environments. Activity incentives are inherent to games, while status and power incentives are also elements, which are often integrated in game play by adding scores, rankings and levels. Self-evaluative incentives can be found in immediate feedback on in game actions and a general view at all time on the progress one has made in a game and the position of the player towards their goal in the game.

Traditionally, two types of motivation are distinguished depending on the reason why people want to engage in a particular behaviour: intrinsic and extrinsic motivation.

The fun in games: intrinsic motivation

Games are intrinsically based on learning principles: one has to use previous information gathered and skills learned to progress in the game (Baranowski et al., 2008). However, players do not seem to mind this 'learning' when put in a context of gaming (Jenkins, 2006b). This is due to the fact that games are intrinsically motivating.

Intrinsic motivation is defined in the literature as the performance of a certain behaviour or activity independent of the direct control of external (physiological or non-physiological) incentives or without the expectation of external rewards in return for the performance of the activity. One performs a certain behaviour or takes part in a certain activity because the activity in itself is rewarding. The behaviour is thus not a means to an end, but a goal in itself (Schmidt, 1983; Clark, 2007). An explanation for why people have these intrinsic motivations can be found in a variety of theories. The main theory used in this context is **Deci's positive-affect theory**. According to the positive-affect theory, humans have the need to perceive themselves as competent, resulting in the search for situations that present a level of challenge. When one is able to overcome this challenge, a satisfying feeling is triggered, with an 'internal reward' as a result (Deci, 1971).

Games are a prototypical example an activity that is carried out for the sake of doing it and not to attain some external reward. The 'fun' element in games plays an important role (Banarowksi et al., 2008). **Fun** games are described in the literature as games that create an enjoying experience (Hsu, Lee, Wu, 2005; Clark, 2007). A concept that is often used in the context of enjoyment in games is that of Flow. Flow experience is a concept introduced by Csikszentmihalyi and refers to a state of mind where concentration is so intense that self-consciousness and sense of time fade. This state of mind can be attained during the performance of certain activities, such as sports, dancing, playing music (Csikzentmihalyi, 1990), but also by playing digital games (Hoffman & Novak, 2009; Chiang et al., 2011). Flow also affects amount of time spent using online services, influencing customer loyalty (Jarvenpaa & Todd, 1997). Sweetser & Wyeth (2005) have developed a GameFlow model that assembled certain elements that need to be present in games to create a flow experience during game play. The main determinant in creating a flow experience is finding a balance between perceived skills of the player and the challenge that goes together with gameplay. Both have to attain a certain level.

Overall, intrinsic motivations for playing games can be triggered by different in-game elements. In our overview, we divide these elements in three categories: the first consists of elements that are related to the person who is playing the game or is related to the character one plays in the game. The second category consists of elements that are game related. The third category consists of elements that are related to the graphical representations in the game.

Table 3. Factors contributing to intrinsic motivation to play.

Person and character related elements	Game related elements	Elements related to graphical representation
Autonomy (Clark, 2007; Dickey 2007)	Challenge (Baranowski, 2008; Clark, 2007, Hsu et al, 2005)	Characters and world are realistic (show similarities with real people and the real world) (Hsu et al, 2005)
Self-efficacy (Clark, 2007; Malone, 1981)	Integrated goals (Clark, 2007)	Stimulation of fantasy (Baranowksi, 2007; Malone, 1981)
Curiosity (Malone, 1981)	Feedback (Clark, 2007; Baranowski, 2008)	
Sense of control (Hsu et al, 2005; Malone, 1981)	Interactivity (Baranowski, 2008; Clark, 2007, Hsu et al, 2005)	
Identification (Hsu et al, 2005)	Rewarding (Banarwoski, 2007; Hsu et al, 2005)	
Sense of power (Hsu et al, 2005; Banarowksi, 2007)	Dramatic scenario (Hsu et al, 2005)	
	Novelty (Hsu et al, 2005)	
	Co-operation (Dickey, 2007)	

As shown in Table 3 above, a lot of research has shown that in-game elements stimulate intrinsic motivation for play. This makes games a suitable medium to transfer information and values or to train skills. These aspects will unconsciously be taken in during game play. It is thus important to take these elements into account when developing a game for empowerment and inclusion, because the targeted audience needs to want to play the game and want to make progress in the game to make it a 'fun' game and to stimulate an enjoying experience.

Self-efficacy

Self-efficacy as mentioned above, plays an important role in the decision making when initiating certain behaviour (Bandura, 1997). Self-efficacy is the perceived ability and the trust one has in oneself to exhibit a certain behaviour (Bandura, 1989). The most influential source is enactive mastery experience: it is organized around previous experiences and successes one had in the past. Vicarious experience is experience gained by watching another person perform an activity. This is why a social component in games is important when trying to stimulate empowering behaviour. However, this could also be triggered by the use of an avatar in a game environment.

An avatar refers to the computerized character in the game world that is used to represent the gamer. By taking the role of a character in a virtual world, one could also gain experience by consequences of the avatar's actions. Verbal persuasion is another source of self-efficacy, also called social persuasion. With verbal persuasion, significant others verbalize their trust in one's capabilities. Community building in and around games can thus be an important factor in stimulating certain behaviour. A fourth source of self-efficacy

comprises physiological and affective states. These are relevant in activities that involve physical achievements (Bandura, 1986). These include coping with stress, health functioning, etc.

Feedback mechanisms integrated in games can stimulate self-efficacy. Another way to promote self-efficacy in a positive way is by providing different difficulty levels in games, adjusting challenges to one's skills (Malone, 1981). The subdivision of a larger, more difficult task in smaller, easier tasks can also influence self-efficacy in a positive way (Kraiger, Ford & Salas, 1983).

More than just fun: extrinsic motivation

Extrinsic motivation refers to engaging in an activity as a means to an end (Vallerand, Fortier, & Guay, 1997, in Garris, Ahlers, & Driskell, 2002). As Garris, Ahlers and Driskell (2002) argue, **extrinsic motivation** tends to be downplayed when discussing the use of digital games for instrumental purposes. Stakeholders are inclined to emphasize that game play is an attractive activity. In addition, it also believed that intrinsic motivation is more effective. Nevertheless, extrinsic motives can definitely influence the decision to engage in game play and those seeking to harness the motivational power of games should take them into consideration as well.

According to **Self-Determination Theory (SDT)** (Ryan and Deci, 2000), there are different types of extrinsic motivation. These vary in terms of the relative autonomy that a person has with regard to a particular activity. To illustrate this with regard to game play, an individual may engage with a game merely because of an external demand, even though he or she is deeply uninterested. Ryan and Deci (2000) refer to this extreme type as external regulation. On the other hand, a person may personally choose to engage in game play recognizing its instrumental value. As Ryan and Deci state, this type of extrinsic motivation, called integration, resembles intrinsic motivation because it is both autonomous and without conflict. As a result, both types of motivation also share the benefits of more behavioural effectiveness and well-being. Between these two ends of the continuum, two intermediate variants of extrinsic motivation can be distinguished (see Table 4).

Table 4. Taxonomy of human motivation (adaptation of Figure presented by Ryan and Deci, 2000)

Regulatory styles	Amotivation	Extrinsic motivation				Intrinsic motivation
		External regulation	Introjection	Identification	Integration	
Associated processes	Perceived non-contingency Low perceived competence Nonrelevance Non-intentionality	Saliance of extrinsic rewards or punishments Compliance/ Reactance	Ego involvement Focus on approval from self or others	Conscious valuing of activity Self-endorsement of goals	Hierarchical synthesis of goals Congruence	Interest/ Enjoyment Inherent satisfaction
Perceived locus of causality	Impersonal	External	Somewhat external	Somewhat internal	Internal	Internal

In the context of empowerment and inclusion, practitioners are often faced with the task of getting people re-engaged, fostering motivation for activities that people have lost interest in. From the perspective of SDT, these practitioners should try to help people move from

performing externally regulated behaviours to more autonomous regulation (Ryan and Deci, 2000). A social context that encourages feeling of **competence** (i.e. self-efficacy), for example through feedback and rewards, and a feeling of **relatedness**, through care and respect, in which significant others provide support without being over-controlling, fostering **autonomy**, is key to this process of internalization and integration. These three needs are precisely the ones that are being satisfied by activities that are intrinsically motivated.

The repetition of behaviour has also been related to fading of external regulation. When a certain behaviour is repeated so often that it becomes a **habit,** one is no longer conscious about the exact reasons for exhibiting this behaviour (Larose & Eastin, 2004). Creating a habit of attitudes towards empowering behaviour is something to take into account. It can be important to not only make people at risk of exclusion aware of the possibilities and opportunities they have and how they can take part in society as a whole, but it has to become a way of thinking and a state of mind.

2.2.3. Game play and participation in other activities

Clearly stakeholders in the inclusion and empowerment domain are not merely interested in getting participants to play games, but also to re-engage them in other activities. One strategy may be to make certain activities an integral part of a game (see many of the examples mentioned in Section 2.1). However, some desired behaviours, activities will still remain external to the game. Can game play also trigger people's interest in those activities?

Another strategy may be to integrate game mechanics in other activities. This has been referred to as gamification.

Game ecology

One example of how game play may actually foster participation in other activities is discussed in the work of Steinkuehler (2011). She presents empirical evidence, based on a series of four studies of boys playing World of Warcraft, that **reading** is an integral part of the activities surrounding game play as players consult various game-related resources often containing dense and complex information. As part of the game ecology, reading was an interest-driven activity, rather than an externally regulated activity. In fact, when struggling readers were given the freedom to select game-related texts they were interested in their reading performance increased.

Approaching game play as part of a network of people and activities encourages a non-technological determinist way of thinking that is not fixated on the impact of a particular technology. Stevens, Satwicz and McCarthy (2008) argue that while it is valid to ask whether and how the activity of game play influences other behaviours, a question often referred to as the **transfer** question, traditional approaches to the question have tended to take place in a lab setting where the context of game play cannot be fully appreciated.

Taking on an ethnographic approach to study game play of preteens and early teens, the authors came to the conclusion that: "an "answer" to the question of how media consuming and repurposing has affected these young people is complicated and contingent; it depends on differing dispositions and purposes that people bring to play, who they play with, and perhaps more importantly what people make of these experiences in other times and places in their lives." (Stevens, Satwicz and McCarthy, 2008, p. 63). Observing different learning arrangements arising around game play (e.g. apprenticeship), the authors suggest

that it may be precisely the social context of sharing knowledge, seeing it being used effectively by others that makes it a powerful learning context. They propose to consider transfer more as an active, rather than a passive learning phenomenon: people may actively use and repurpose skills, dispositions or learning arrangements from one setting to another.

Gamification

Gamification, as mentioned previously, refers to the use of game design elements in non-game contexts. As Deterding and colleagues (2011), it is a contested term that only recently made its entrance in academic discourse and deserves more conceptual elaboration. The authors distinguish gamification from introducing playful interaction, emphasizing the use of game as a digital design artifact. They distinguish it from special-purpose games (calling it serious games), emphasizing that only elements of game design (see Table 4 for the classification proposed by Deterding et al.) and not entire games are introduced to non-game contexts (i.e. settings in which the expected use extends beyond entertainment).

Table 5. Categorization of game design elements that can be brought into non-game contexts as discussed by Deterding et al. (2011)

Design elements	Description/examples
Interface design patterns	Interface elements such as badges, levels, leaderboards, …
Game design patterns	Game mechanics, described by Sicart (2008) as "methods invoked by agents for interacting with the game world"
Design principles or heuristics	Guidelines for approaching a design problem or evaluating a design solution
Conceptual models of game design units	Conceptual frameworks such as the Mechanics-Dynamics-Aesthetics Framework (Hunicke et al, 2010) or concept of game design atoms (Braithwaite and Schreiber, 2008)
Game design methods	Including game design specific practices such as play testing and design processes like play centric design (Fullerton, 2008) or value conscious game design (Belman and Flanagan, 2010)

A well-known and often mentioned example is **Foursquare**, a social network site and application in which users can earn points and badges when they check into particular physical locations. **Causeworld** resembles Foursquare. However, when users check into a certain location they are awarded with the opportunity to support a good cause such as the American Red Cross. **Recyclebank** encourages recycling and other 'green' activities by offering rewards, shop discounts and the opportunity to share one's accomplishments with others. **Free Rice** is an online quiz in which correct answers result in rice donations to the United Nations World Food Program. **Crowdtap** combines social media and crowd sourcing to let brands communicate with their customers. People are rewarded for their participation in brand research. **Fun for a change** is a project that encourages students to come up with gamification ideas in the context of a design competition.

An issue that arises with many gamification examples is that of privacy. Groh (2012) points out that many examples gather personal information, not necessarily only for the benefit of its users alone, and make some of this (e.g. achievements) publicly available.

Motivation to play, participate and learn

Motivation in the broad sense refers to being moved to do something. When seeking to harness the motivational power of games, stakeholders should consider two broad types of motivation (as decribed in Self-Determination Theory – Ryan and Deci, 2000).

Intrinsic motivation: Game play as a goal in itself; playing the game because one considers it to be an enjoyable, fun activity that is rewarding as such. It is the result of interplay between game characteristics, personal and contextual characteristics. Certain aspects of game play may tend to make this activity interesting for many people, but not necessarily for everyone. It requires that a person's basic needs for competence (i.e. **self-efficacy**), relatedness and autonomy are satisfied. A person's social context plays an important role in this respect.

Extrinsic motivation: Game play as a means to an end. There are different types of extrinsic motivation that can be situated on a continuum depending on the relative autonomy of the individual. Extrinsic motivation is not necessarily an impoverished form of motivation in which a person only engages in an activity because of external demand. There is also a form that resembles intrinsic motivation, where people choose freely to engage in an activity recognizing its instrumental value.

In the context of empowerment and inclusion, practitioners that wish to (re-) engage people in a particular activity through games may approach this in different ways:

1. **Game play**: Seeking to integrate this activity into a game, thereby:
2. Fostering intrinsic motivation for the activity provided that people are interested in game play
3. Fostering a form of extrinsic motivation in which people recognize the instrumental value of the activity and choose to engage in it
4. **Gamification**: Taking game design elements that are considered to engage people and applying them to the activity in a non-game context
5. **Consideration of gaming ecology**: Consider how games are part of an ecology in which game play has a bearing on other individual and social activities and vice versa.

2.3. Application domains

Digital games, both non-commercial and commercial, are being put to use for a variety of purposes other than entertainment across a variety of sectors. While there have been various ways of categorizing these application domains (see for instance, Blamire, 2010; Zyda, 2005; Michael & Chen; 2006, IDATE, 2012), a prominent categorization is the one by Sawyer and Smith (2008). To facilitate discussion among stakeholders and organization of future work in this regard, Sawyer and Smith proposed a comprehensive taxonomy in which these digital games are categorized as follows:

Sectors interested in using digital games for purposes other than entertainment:

1. Government and NGOs
2. Defence
3. Healthcare
4. Marketing and communications
5. Education
6. Corporate
7. Industry

Purposes for which they are applied:

1. Health
2. Advertising
3. Training
4. Education
5. Science and Research
6. Production
7. Work

We acknowledge that the given taxonomy is not specific to digital games for empowerment and inclusion, and effort should indeed be made to situate DGEI per se. In future work, an attempt could be made to systematically identify the various goals for which DGEI are being applied. At this point, we will provide a general discussion examples of how digital games have been applied across the aforementioned sectors and link this – wherever it is relevant or possible - to **three broad goals** envisioned in the context of empowerment and inclusion that we have put forth at the start of this report:

1. Supporting disengaged and disadvantaged learners and enhancing employability
2. Promoting health and well-being
3. Fostering civic participation and community-building

2.3.1. Government and NGOs

In this sector, games are being used to inform or communicate with the public dealing with topics such as culture, ecology, business, humanitarian affairs, politics and government. Games concerning culture can aim to stimulate interest in certain historical buildings or places (**Rallye Place-Royale** by Musée de la civilization). Games for ecology aim at raising awareness about problems such as climate change and energy-related problems (**Enercities** by Paladin Studios, Climate Challenge by Red Redemption Ltd.). Public games that target business cover subjects such as business start-ups (**My Cyber AutoEntreprise** by Succubus, Enterprise Battle by Ranj Serious Games), how to be smart with energy in enterprises (**Energy-Wise** by PIXELearning, etc. Humanitarian games cover subjects such as poverty, human rights and the working of certain organizations, such as Amnesty International (**Bulletproof** by Mobigame) or the World Food Programme (**Food Force**). Games that cover political and governmental subjects, aim to raise awareness about certain authorities such as the European Union (Neurodyssee by Belle Productions).

Some of these games explicitly target civic engagement. For instance, **Community Planit** (Engagement Game Lab), a location-based game that that supports participatory community planning bringing people together through game play to think about how to improve their own community. In 2.6.1, we will elaborate further on the effectiveness of games used for enhancing civic engagement among children and adolescents.

2.3.2. Defence

Games in the civil defence sector are developed in the context of recruitment or training. Military games can also aim at providing current servicemen with new knowledge and help them train certain skills. **Tactical Iraqi** for example, was developed by Aleleo to teach military personal Arabic speaking and listening skills and give insight in local culture (Surface, Dierdoff & Watson, 2007). Other versions for Pashto, Dari, French and Indonesian were also developed later.

Moreover, the American army has launched a department dedicated to design videogames related to the training of their recruits, releasing a budget of 50 million dollars over a time span of five years. These games mainly focus on skill teaching and attitude change as they aim to convince players to conscribe. **America's Army** for example is a first person shooter game that is available for free on the Internet and was developed by the American army to motivate adolescents to join the army.

2.3.3. Healthcare

In the healthcare sector, games have been deployed for a wide range of purposes. Many of these games aim at raising awareness about certain physical and mental health issues, promote health and well-being and/or supporting those that are dealing with health problems. Games used for stimulating wellness and healthy behaviour are well documented cases, using mainly experimental design to test effectiveness of these games. This will be discussed in 2.6.2.

Examples include games that raise awareness about depression (Elude by Singapore MIT), drugs (Divo's Buzz by Ranj Serious games), smoking (Rex Ronan by Super Nintendo Entertainment System), HIV (Life Challenge by New York State Department of Health) and promoting awareness of the dangers of a heart attack (Heart Sense by University of Pennsylvania).

Other health games target a specific population such as children with ADHD (The STAR Project by Goldsworthy et al.), diabetic patients (L'affaire Birman by Graphbox), cancer patients (Re-mission by HopeLab), people with asthma (Bronkie the Bronchiasaurus by WaveQuest), etc. These games mainly aim at making people understand their condition and facilitating certain activities related to it (e.g. medication intake for disease treatment).

Games concerning health can also aim at different types of prevention such as AIDS prevention, drug prevention or stimulate healthy eating to prevent overweight. Health games can also target people who are disabled in the real world due to their illness. These games create the possibility to practice skills in a virtual world without having to face real-world consequences, which is considered a particular value of digital games (Buckley & Anderson, 2006). Finally, certain games in this domain aim to create a community of people with a certain disease or disability, turning the game world into a communication platform (Re-mission by Hopelab).

2.3.4. Marketing and communications

Within the marketing sector, games have been used in various ways for advertising. Possibilities of in-game advertising include advergaming, product placement (e.g. character wearing brand clothing), using real-world analogs (e.g. virtual billboards picturing a particular brand) and cross-promotion (Capcom and Diesel Jeans partnership for **Devil May Cry**) (Horwitz, 2004, in Vedrashko, 2011).

The multitude of advergames available and the sophistication of some of them becomes apparent when one visits advergames.com, a website that aggregates this type of games. Examples include **The Art of Flight** sponsored by Red Bull offering a virtual snowboard experience and **Fight for Kisses** sponsored by Wilkinson.

With regard to product placement and real-world analogs a famous examples includes the **Grand Theft Auto** series (Rockstar Games) that features existing care types. Brown (2006)

describes multiple examples including product placement in CSI: 3 (Ubisoft) in which "Visa's fraud-protection service alerts players to a stolen credit card that helps gamers crack a murder case".

2.3.5. Education

Games used in education aim to stimulate learning in the stricter sense aiming to convey knowledge and improve skills. In a school context, they can involve both classroom and home usage. The range of subjects covered by games used in education is broad and can be linked to certain subjects such as history, mathematics, foreign languages, biology, etc. (Wastiau, Kearney, & Van den Berghe, 2009). It is important to note that games in education generally do not aim to replace but rather to complement traditional course materials by providing interactive ways to engage with content or to exercise.

As mentioned above, commercial off-the-shelf games have been proven to be a helpful tool in an educational context, containing intellectual challenge and content (Van Eck, 2006; Charsky & Mims, 2008). Commercial games such as **Civilization** (MicroProse) used in an educational context, have proven to increase civic knowledge and civic engagement, which could work empowering and stimulating people to take part in society. Different commercial off-the-shelf games have also been a useful tool in motivating foreign language learning (Wastiau, Kearney, & Van den Berghe, 2009), such as **Zoo Tycoon** (Big Fish Games), **Civilization** (MicroProse) and **The Sims** (EA). Several studies have tested both special-purpose games and COTS to attain the same goal, such as brain training (Green & Bavelier, 2008) and language learning (De Grove, Van Looy & Mechant, 2011). The effectiveness of COTS and games specially designed for these purposes will be discussed in 2.6.

Knowledge transfer is not always the primary goal of games in education, however, as they can also aim to raise awareness about subjects such as opportunities in the professional market, juridical and social rights, poverty, etc. is not always the primary goal, however, as they can also aim to raise awareness about subjects such as opportunities in the professional market, juridical and social rights, poverty, etc. Moreover, educational games for raising awareness aim to empower their audience by guiding their future choices. Raising awareness about juridical and social rights (**Olympe** by 3D DUO), for example, could be empowering for groups at risk of exclusion and presents them with the opportunity to become more independent and help them in taking control of their own lives by making them aware of what they are entitled to.

Another empowering example is the location-based game initiative **No Credit, Game Over!** (Eurowheels), which is a digital city game that covers the topic of financial debt, crisis situations and sustainable consumption. This game targets youth who live in the margins of society and are the first that will feel the consequences of economic depression and are thus at risk of exclusion. No credit, Game over aims at teaching both financial and media literacy to this particular target group.

Finally, games such as **Kompany** (Ouat Entertainment) and **Infinity** (Crossroads digital media) provide information about job opportunities in different industries and what competences are needed. This broadens the player's horizon in terms of job opportunities and helps them to take seize these opportunities.

2.3.6. Corporate and industry sector

In the corporate and industry sectors, games can be used to offer training to employees, to attract or inform potential employees. Games designed for professional training aim at the development and maintenance of a professional activity or of competences needed in a certain professional industry. They can target both managers and employees and cover subjects such as safety and sector-specific competences. PIXELearning (2010) for example, is a company, which is involved in developing simulated environments and serious games for business education. Games for professional training can target both managers and employees and can cover general skills or sector specific skills, such as those mentioned above.

Existing games in this domain cover a variety of skills for a variety of target groups. They are developed to enable engineers to check their competences (**EDF** by Real Fusio) or teach a new software (cfr. supra), to exercise courtroom skills when studying law (**Houthoff Buruma The Game** by Ranj Serious games), to teach the basics of stock and options trading (**Darwin Survival of the Fittest** by Ameritrade games) etc. Games aimed towards managers mainly deal with management skills, covering subjects such as human resources (**Entretien de Recadrage, Entretien Annuel** and more by ITycom) how to manage environmental issues in a business (**Energy-Wise** by PIXELearning), successfully guiding an agenda through a variety of increasingly complex meetings (**Virtual leader** by SimuLearn), etc. Finally, games for professional training can also aim at raising awareness about an issue. **Diversité** (Daesign) for example treats the subject of diversity and non-discrimination. The aim of this game is to train managers in making decisions exclusively based on competence criteria.

In recent years employers have started using digital games for generating excitement among young job candidates and enhancing employees' skills (Sitzmann, 2011). Hotel Group Marriot International for example, has launched Facebook game **My Marriot Hotel** (developer unknown) in 2011 to recruit new employees. Employment agency Kelly Services created **Kelly's Second Life** (Linden Labs) to enable job seekers to work in a variety of virtual jobs that mirror some of Kelly's career opportunities (Entertainment Software Association, 2011). Canon U.S.A. has developed a game to train new copier technicians and to teach them copy machine repair by dragging and dropping parts into the right spot on a copier (Sitzmann, 2011). Cold Stone Creamery issued the development of **Stone City** (Persuasive Games) to train employees in customer service, speed of service, accuracy in portion sizes and correct recipe recognition. These games focus more on low-level training within companies, in employment and employability services, making them more interesting in the context of social inclusion and empowerment.

Application domains

Digital games are currently being used with a purpose beyond entertainment in a variety of sectors (i.e. government, defense, healthcare, marketing, education, corporate and industry sector) for a wide range of purposes (e.g. advertising, training, health promotion) (see also Sawyer and Smith's taxonomy of serious games, 2008)

The available examples show that digital games (special-purpose and COTS) are already being put to use to achieve the goals that those working to empower and include people commit themselves too:

1. **Supporting disengaged and disadvantaged learners and enhancing employability**: E.g. games helping people with learning disabilities, games that support low-level training
2. **Promoting health and well-being:** E.g. games aim at raising awareness about certain physical and mental health issues, promote health and well-being either as part of prevention, or in support of those that are dealing with health problems
3. **Fostering civic participation and community-building**: E.g. games raising awareness about political and governmental topics, games supporting participatory community planning.

2.4. From game development to reaching the audience

In the previous subsections, we have illustrated that several digital games have been developed specifically for the goal of empowerment and social inclusion. Scenarios on how to undertake the process of developing and effectively publishing digital games for empowerment and inclusion are, however, far from established. In this section, we provide an overview of literature that gives us information on this process, stakeholders that are likely to be involved and the issues they face.

We do so by first taking a look at the traditional value chain in game industry and the recent trends that have led to a re-conceptualization of the market in terms of a value ecosystem or network (Section 2.4.1). We then consider which stakeholders are additionally involved in this ecosystem when we move to the special-purpose (or serious) games market and the social inclusion field, proposing a preliminary framework (Section 2.4.2). We conclude with a discussion of the sustainability and distribution challenges faced by stakeholders to bring DGEI to their target audience (Section 2.4.3).

2.4.1. Game industry: From traditional value chain to ecosystem

The 'Born Digital/ Grown Digital' report on the competitiveness of the digital games software industry (De Prato et al., 2010) provides a comprehensive picture of the evolution that this still relatively young industry is undergoing. As the availability and popularity of online and mobile games is growing, the traditional view of a distribution retail value chain is being challenged to make room for a more dynamic, eco-systemic view.

Figure 3. Traditional retail value chain (De Prato, 2010, p.45).

The traditional value chain view of the digital game industry is visualized in Figure 3. It identifies important roles in the game industry. **Game developers** (small independent game studios or part of larger enterprises linked to a publisher or console manufacturer) perform those activities that lead to the creation of the game. **Suppliers** of enabling technology provide the middleware that makes production of the games possible (game engines and other tools). Suppliers at the end of the value chain enable consumers to play digital games by providing platforms such as consoles, PCs and mobile devices. **Publishers** manage the presentation, pricing and marketing of digital games. **Distributors/Retailers** are involved in the logistics of getting the game to the user.

Call out 5: Online distribution of games

Given the increasing popularity of online distribution (often managed by online distribution platforms, such as Amazon and Steam), the role of traditional retailers has diminished. When looking at online games, distribution can take other forms. Often a distinction between browser-based games and client-based games is made.

Browser-based games refer to games that can be accessed and played via a browser. These games typically do not require additional software to be installed on the client device (computer, console, mobile phone) which makes them easier to distribute and access.

Client-based games require the installation of an application on the player's client device to make it possible to play the game. Online distribution of these games takes place via downloads from a website or a client application (e.g. Steam).

While making clear which roles actors in the game industry can take up, this view assumes a static relationship between the different actors. Although such a relationship to some degree still holds for the console market, it is inadequate for understanding the dynamics of the online and mobile game market. Online and mobile games have created opportunities to bypass actors such as publishers, to address new audiences and even involve them in the creation process (see Call out 5). As a result, a linear view on value creation cannot be maintained.

The 'Born Digital/ Grown Digital' report (De Prato et al., 2010) proposes to consider the digital game industry as an ecosystem, acknowledging the flexibility of the relationship between the various actors. Figure 3 presents an attempt by the authors of the aforementioned report to capture such an ecosystem.

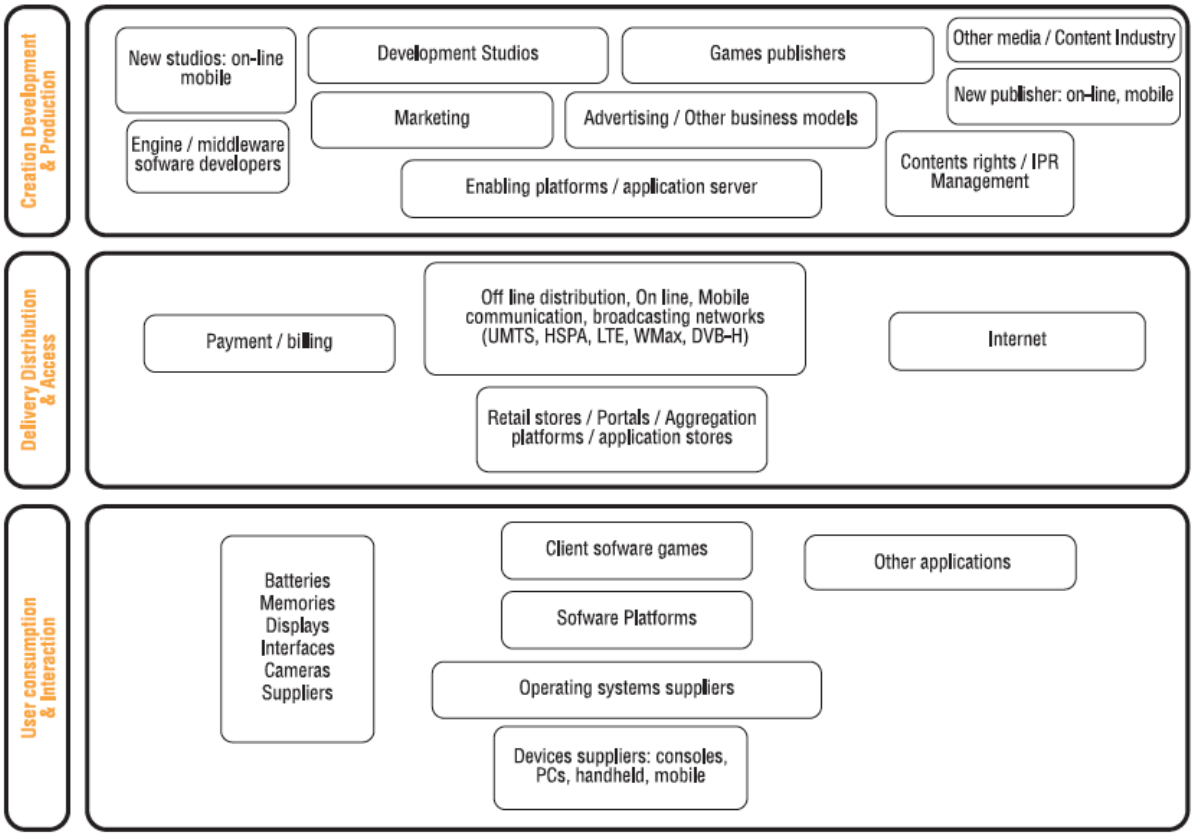

Figure 4. Components of the digital games software industry ecosystem as presented by De Prato et al. (2010).

2.4.2. Broadening the ecosystem: The role of social and public partners

The question then arises to what extent the ecosystem has to be revised when considering how value could be created for games in the context of inclusion and empowerment. To address this matter, we first look at how the value network is extended in the market for special-purpose or serious digital games in general and then consider stakeholders in the field of social inclusion.

Key stakeholders in the serious games market

According to the IDATE report on serious games (IDATE, 2012), stakeholders in this market include those involved in the commercial game industry, but also a group of additional stakeholders. **Game developers**, for instance, can also be research institutions and educational institutions, creating digital games as well as providing a scientific basis and content for them. **Investors** can be government institutions, companies, public organizations, or other interested parties. A third group of stakeholders is formed by **promoters** of the use of serious games. This group includes authorities, professional organizations and media groups. A fourth group consists of initiators and adopters in the **target sectors** (see Application domains): those setting up initiatives and those participating in it.

Key stakeholders in the field of social inclusion

A European report on stakeholder involvement in social inclusion policies (2010) identifies three broad groups of stakeholders that may operate on the EU, national, regional and/or local level:

4. **Decision-makers**: Government, parliament and administration involved in decision-making
5. **Secondary stakeholders**: Intermediaries in the policy process such as employers, trade unions, representative organizations or service providers, organizations representing vulnerable groups, experts and media
6. **Primary stakeholders**: People experiencing poverty and social exclusion and the public at large

Hence, initiatives seeking to deploy games for empowerment and inclusion of at-risk populations (i.e. **game-based empowerment and inclusion initiatives/projects**) will necessarily involve these stakeholders as well. Indeed, like other ICT tools, games will not necessarily increase empowerment and inclusion, even if they are designed to exhibit particular properties as discussed earlier. The effectiveness of using games will depend on how they are embedded in the context of at-risk populations: the setting of use, communities local to or of interest to these populations, and the national and local regulatory practices. As such, social and public partners responsible for regulation and/or implementation of ICT-based initiatives have an important role to play (Phipps, 2000).

Social and public stakeholders in game-based empowerment and social inclusion initiatives may thus take on the role of game developers, promoters, initiators, adopters and regulators. **National governments** sets up dedicated policy units to gain understanding of empowerment and inclusion and to establish how policy can influence it. National and local **governments** start national and local initiatives (e.g. anti-poverty strategies and community planning) for digital and social inclusion and empowerment. **Schools and universities** may create as well as participate in game-based empowerment and inclusion initiatives. Public institutions may provide **access** to ICT in general and gaming technology in particular (e.g. libraries). Finally, other institutions, such as community networks and resource centres, can **facilitate** the use of ICT as a community activity thereby having contact with otherwise difficult to reach audiences.

In the figure below, we propose a preliminary version of **a value network or ecosystem for digital games for empowerment and inclusion** containing the different stakeholder roles deemed relevant in this respect. To construct this framework, we started out from the De Prato framework in Figure 4 for the digital games industry in general and adapted it to include the stakeholder roles that were discussed above and those that we identified in the case studies that we conducted for this report (see Section 3).

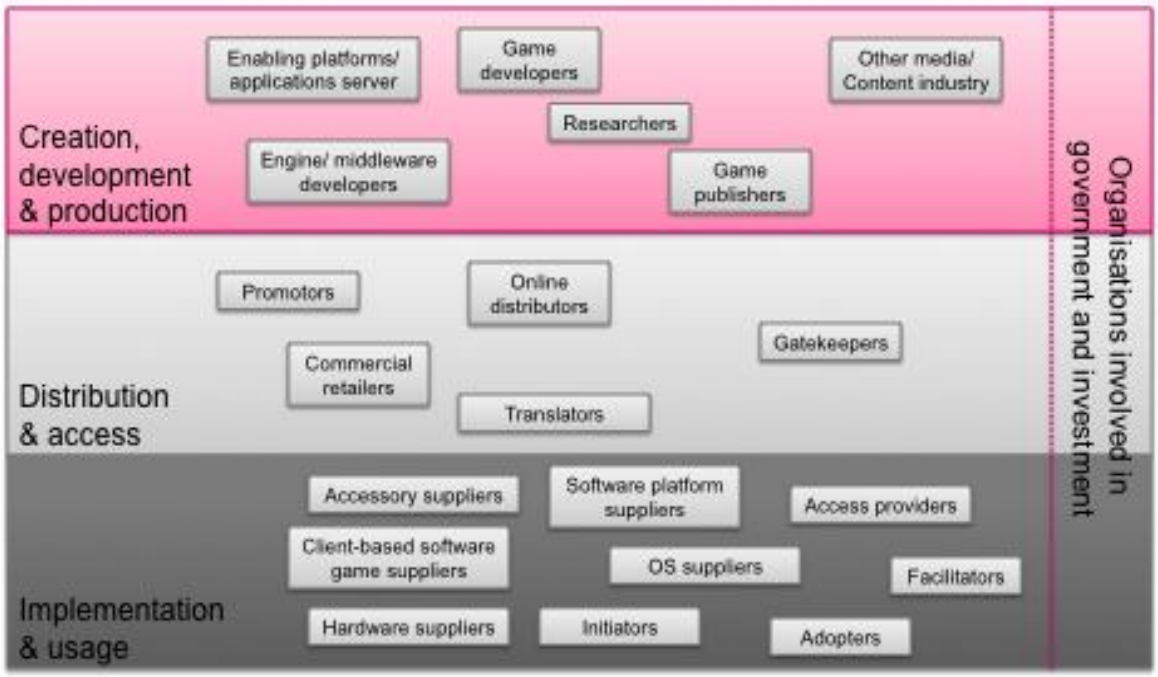

Figure 5. Building blocks for digital games for empowerment and inclusion ecosystem (an adaptation of the digital games software industry ecosystem by De Prato et al., 2010, in Figure 4).

In Table 6, we further clarify this framework by applying it to the PING case presented in Section 3.1. In the first column, the specific actors are listed that were involved in this project. In the second column, their corresponding stakeholder roles are identified using the labels in Figure 5. Each stakeholder role is further described in column 3. This example shows that the framework can be used to illustrate the different roles of actors who are involved and whether a single actor takes up multiple roles in the project.

Table 6. Application of the preliminary DGEI eco-systemic framework to PING case.

Specific stakeholder	Stakeholder role	Role description
GriN multimedia	Game developer	Professional game development company that created PING
King Baudouin Foundation & Institute for Broadband Technology (IBBT)	Initiators & Investors	Both organizations started up the project and invested both financially and in terms of personnel
Calouste Gulbenkian , Bernheim & Robert Bosch Foundations	Investors, translators, & promoters	Provided financial support, translated the game and ensured introduction in their respective countries
Flemish and Walloon government	Investors	Funded a PING related international conference on games for raising awareness
European Schoolnet	Facilitator	Provided documentation for teachers on how to use PING in the classroom
Anti-Poverty network & partner organizations	Content expert	Provided input and feedback on the content and game play in the course of the project regarding the representation of poverty.

IBBT research group MICT, Ghent University	Research	Investigated PING use, game experience and perceived learning after its introduction, both in the classroom and at home
Schools	Formal gatekeepers and access providers	The target group was reached via schools. School IT infrastructure was used to allow youngsters to play PING at school
Principals, teachers and pupils	Facilitators and adopters	Principals and teachers were involved in deploying PING in schools
EU government	Government	The PING project was initiated in the context of the European year against combating poverty and social inclusion in 2010

2.4.3. Reaching the target audience

The research-market gap: sustainability and distribution challenges

As of yet, scenarios for taking games to market in the context of inclusion and empowerment are far from established. Some lessons can be learned, however, from the success and failure of bringing academic **game-based learning** software to scale. Drawing from discussions with developers active in the academic and the private sector, Mayo (2010) points out that the lack of an established serious game market is not due to game development per se, but to tensions between the academic and the commercial environment.

As Mayo (2010) argues, the **difficulty of reaching scale** is not a matter of lack of games, interesting content or development costs. He states those cannot be major issues, as there are games being created that can attract a wide audience with increasingly easier to use development tools and means of exchanging content without excessive development costs. Instead, difficulties appear because on the one hand academic teams lack the funding and knowhow to make a product commercially viable, market and distribute it, while on the other hand the business models of commercial companies are not always adjusted for the given purposes.

Mayo (2010) sees indications that projects are starting to secure more appropriate types of funding for content creation than one-off project grants. However, once the content is there, getting to the customer and getting return on investment also presents a number of challenges. These are challenges of sustainability (i.e. how to create a sustainable business model), distribution (i.e. selecting and creating appropriate distribution channels) and customer **acceptance** (i.e. getting organizations or individuals to adopt the game). This last issue will be discussed in the following section.

In terms of **sustainability**, Mayo (2010) distinguishes between approaches for the primary and secondary school market (K12-market) on the one hand and the public and higher education market on the other. He does so based on the assumption that in the former market one tends to have to go via a central rules-bound authority to reach the customer, while this is generally not the case for the latter market. Approaches that have been applied to the K12-market include those directly targeting teachers (via teacher platforms), students (through corporate sponsorship) and districts AND those going via teacher training or student hardware provision. In the public market, approaches include targeting parents

(software for young children or hardware-software pairing), older children and youngsters (via corporate sponsorships) and adults (e.g. in the context of lifelong learning).

With regard to **distribution**, Mayo (2010) emphasizes that the difficulty for the K12-market lies mainly in the fact that distribution networks have to be set up personally. For the public market, choices need to be made as to publish and distribute yourself or work together with existing publishers and distributors. This choice involves making a trade-off between the amount of control one wants to maintain over the game and the investment one is able to make. Given the ease with which games can be placed online, the temptation of equating this with convenient distribution is an easy trap to fall into. Mayo (2010) stresses the importance of getting people to find the respective website and warns that in this respect purely digital marketing has not been particularly successful.

The **research-market gap** has been observed specifically with regard to **games for inclusion and empowerment** as well. Gershenfeld, founder and president of E-line Media[4], a U.S. based company that creates games for empowerment purposes, observes in an article available at the Games for Change Network (n.d.) that, in this context, social and public partners often need to act as game publishers even though they are not staffed or equipped to do so. They need to ensure investment for the game, they choose developers to create a game, they need to make sure that the game reaches its target audience and they need to assess impact of the initiative.

In an attempt to assist these 'accidental publishers' (i.e. foundations, non-profit, universities, government agencies, social entrepreneurs, philanthropists, ...) in becoming more effective, Gershenfeld proposes a **publishing methodology** that they can use to reach financial sustainability. In this methodology, we can roughly distinguish the following components: getting to know the target audience, its needs and requirements, establishing anticipated cost and benefits, getting a clear view on market supply and demand, selecting and ensuring management for a team of developers, and setting up clear-cut plans for how to create a game that is both fun and effective, how to market and distribute it and how to support it and assess its impact once it is released.

Gershenfeld continues to argue that creating a sustainable financial model is a considerable challenge, not in the least because game-based initiatives bring together stakeholders that are seeking to create value in different ways. He proposes three approaches or **scenarios in which social ventures can seek to balance social impact and financial returns**:

1. **For-profit that strives to maximize both financial returns and social impact**: Likely to frustrate both groups of stakeholders, many trade-offs need to be made which are likely to be managed inconsistently, ineffectively, hence considered high-risk
2. **For-profit that strives to maximize financial returns with qualifying social impact**: Ideally organic alignment between desired social impact and core business model that is so embedded in the core value proposition of the model that it defines the brand and is aligned with customer satisfaction and perception of value. Creates opportunity to attract top entrepreneurs and traditional venture capital or angel financing

[4] E-line Media was founded to address this research-market gap (informal communication – this was brought up during the expert interview that we conducted on Gamestar Mechanic)

3. **Non-profit that strives to maximize social impact with sustainable revenue**: Social entrepreneurship. Positions the organization to align toward social impact and to more easily access public funding, without being completely dependent on donations

While Gershenfeld's perspective is but one possibility, it points towards some of the challenges that social and public partners face when dealing with DGEI and one of the rare attempts at providing a practical answer to these challenges.

One approach to conceptualizing the value that public stakeholders aim at is the public value approach. According to authors such as Benington and Moore (2009, in Coyle and Woolard, 2010), this approach "advances the idea of value beyond standard economic theories of exchange value (which reflects market prices), labour value (which reflects the amount of human effort invested in its production), and use value (which reflects how useful an item is to a given person or situation)" (Coyle and Woolard, 2010, p.12). Including also value on an economical, socio-cultural and political level, public value is strongly grafted onto the relationship between public agencies and the citizens making use of their services bringing matters of legitimacy and trust to the fore.

Reaching at-risk groups: Intermediary organizations as gatekeepers

The challenge of successfully making the step from research to the market is further complicated in the context of empowering those that are at risk of exclusion. Vulnerable and at-risk groups are often hidden and hard-to-reach (Emmel, Hughes, & Greenhalgh, 2006). Numerous studies acknowledge that **at-risk groups are difficult to reach via a one-on-one approach** (Emmel, Hughes, & Greenhalgh, 2006; Jehoel-Gijsbers & Vrooman, 2007; Liamputtong, 2007; Matthews & Cramer, 2008). The main reason for this is the absence of a trustful relationship between at-risk individuals and unknown third parties. Or as Liamputtong (2007, p.36) describes it: "Confidentiality is extremely important with some vulnerable groups, particularly those who are marginalised and stigmatised in society." Consequently, the best way to reach at-risk groups is via intermediary organizations that are already embedded in the immediate social and cultural context of these at-risk groups and hence, have already established a long-term relationship of trust with them (Haché & Cullen, 2010). Some examples of intermediary organizations are poverty organizations, public computer spaces and health institutions, shelters and youth organizations. Liamputtong (2007) also refers to health and social care agencies.

This has two major implications for the use of games or other types of digital tools and applications for inclusion and empowerment of at-risk groups. First, it means that implementing such tools needs to be organized in close collaboration and agreement with intermediary organizations. Second, and similar to conducting research with at-risk groups, it implies that **intermediary organizations are gatekeepers** that have the power to accept or deny access to the at-risk groups they are working with (Reeves, 2010, p.317): "Central elements of access are gatekeepers. These people can help or hinder research depending upon their personal thoughts on the validity of the research and its value, as well as their approach to the welfare of the people under their charge". Emmel et al. (2007) explain that organizations insist on their role as gatekeeper to ensure that the proposed activities, be it research or the implementation of a new tool, does not undermine their interests and activities and hence, does not hamper their relation with their at-risk participants.

Several researchers have identified different types of gatekeepers based on their trust relation with at-risk populations: formal, comprehensive and informal gatekeepers (Emmel, Hughes, & Greenhalgh, 2006; Emmel et al., 2007; Liamputtong, 2007). **Formal gatekeepers** refer to those organizations that work with socially excluded people with a particular aim to control, supervise and rehabilitate. Formal gatekeepers show a highly vertical relationship of power with at-risk groups and are rarely involved at community level. Examples are unemployment offices, social housing offices or formal education institutions. Due to the inequality at a relational level, at-risk groups do not trust formal gatekeepers nor do they highly value the services delivered by these formal gatekeepers. Hence, as indicated by Emmel et al. (2007, p.6): "The difficulties in accessing such people through these formal gatekeepers are, in part, explained by the role of these organizations in addressing social exclusion. Access is not possible because these gatekeepers are distrusted by socially excluded people with whom we were trying to gain access." This implies that implementing the use of digital games for empowerment and inclusion through formal gatekeepers is likely to be unsuccessful. However, possibilities might exist at the level of comprehensive and informal gatekeepers.

Comprehensive gatekeepers are those organizations that have a long-standing relationship with at-risk populations thanks to their ability to mediate access to services that address day-to-day needs. In general, comprehensive gatekeepers deliver specific services, but also function as a referral agent across all types of health and social care service provisions (Emmel, Hughes, & Greenhalgh, 2006). Some examples are poverty organizations, telecentres, e-inclusion initiatives, youth centres or local socio-cultural communities. Emmel et al. (2007, p.7) emphasize the added value of these comprehensive gatekeepers: "One consequence of their comprehensive service provision is that these gatekeepers have an increasingly trustful relationship built up over time in the networks of socially excluded individuals and groups." Policy makers, game developers, game distributors and researchers should reflect upon collaboration with different comprehensive gatekeepers and think about appropriate ways to integrate the use of digital games for empowerment and inclusion into the specific services delivered by these comprehensive gatekeepers. An important remark is that comprehensive gatekeepers in some sense still have an institutionalized character, meaning that they are often bound to a certain location, a certain building or certain services. Hence, stimulating the in-home use of digital games by at-risk groups through comprehensive gatekeepers seems less fruitful.

However, in-home use might be reached via collaboration with **informal gatekeepers**. These are organizations or individuals that are not institutionalized in any way and use their own resources to address the needs of the at-risk individuals they work with. They tend to live and work in the at-risk community itself and hence, have a befriending, supporting and protecting relationship with the at-risk individuals of this community which makes that "the informal gatekeeper, who is part of networks such as these, has the complete trust of those with whom she works" (Emmel et al. 2007, p.8). Reeves (2010) adds that informal gatekeepers influence others through the strength of their personality and character. This is confirmed by Liamputtong (2007:51) who refers to informal gatekeepers as persons in authority that "will act as a bridge to link into a new social world, as a guide who points out what occurs and how culturally different actions are locally meaningful, or as a patron who helps to secure the trust of community members." Important, however, is that informal gatekeepers might show the same characteristics as at-risk groups themselves and hence, mistrust third parties and reject ideas like the use of digital games for empowerment or

inclusion (Emmel, Hughes, & Greenhalgh, 2006). A negotiation process about the added value of such tools will be necessary.

From game development to reaching the audience

The traditional linear view on value creation in the digital games industry (see Figure 3) has come under pressure due to the growing mobile and online market. While it still holds to some extent for the console market, the online (see Call out 5) and mobile gaming market warrant a more dynamic view, that of a value ecosystem or network (see Figure 4).

Starting from such a dynamic perspective view on the market for special-purpose games, we propose a preliminary value network or ecosystem for digital games for empowerment and inclusion (see Figure 5), which encompasses stakeholder roles typically found in the games industry, as well as roles specific to this market.

As of yet, scenarios of taking games to market in the context of inclusion and empowerment are far from well established. It is clear, though, that the following challenges present themselves along the way:

1. **Sustainability**: Creating a sustainable financial model
2. **Distribution**: Selecting and creating appropriate distribution channels

Developers, social and public partners are facing the difficulty of progressing from research to market because they do not have sufficient resources (money, staff, skills, ...) to do so. Efforts are being made, however, to share knowledge on how partnerships among stakeholders can be formed to balance the different types of value that they are trying to create, i.e. social impact and financial returns (see work of Gershenfeld).

The challenge of successfully making the step from research to market is additionally complicated when dealing with a target users that are at-risk of inclusion, because they are often hidden and hard-to-reach. Ideally, they are reached via intermediary organizations that have an established trust relationship with these groups and hence act as gatekeepers who can allow or deny access to at-risk groups:

1. **Formal gatekeepers:** Organizations that work with socially excluded people seeking to control, supervise and rehabilitate them. The relationship between at-risk populations and these gatekeepers tends to be problematic, hence reaching at-risk groups via these gatekeepers will likely be unsuccessful.
2. **Comprehensive gatekeepers**: Organizations that have a long-standing relationship with at-risk populations thanks to their ability to mediate access to services that address day-to-day needs. At-risk groups may be reached through the services these gatekeepers offer.
3. **Informal gatekeepers**: Organizations or individuals that are not institutionalised and use their own resources to address the needs of the at-risk individuals that they have a strong trust relationship with. They may present a path to encouraging in-home use. However, strong negotiation may be required to gain their trust.

2.5. Adoption, implementation and usage

Having an offer of digital games for empowerment and inclusion does not guarantee that these games will actually be adopted and used. In this section, we first look at the general adoption of special-purpose games. We then elaborate on drivers and barriers for adoption and appropriation by at-risk groups, and adoption and implementation by intermediary organizations.

2.5.1. Figures on the usage of special-purpose games

Figures on actual usage of special-purpose games across application domains, age and gender categories are rare. The following data are based on the IDATE report 'Serious games: Enjeux, offre et marché'[5] (2012). While these provide insight in trends in the global serious games market, they should be considered as indicative rather than absolute (see Call out box 6).

Call out 6: IDATE report

The IDATE report issued in 2012 provides an overview of the global 'serious games' market. It distinguishes the following target sectors: education, professional training, health, information & communication and defense. Per sector, it presents figures on distribution and uptake, technological and economical issues and case studies.

The results of the report should be considered as indicative for the following reasons:

- It considered a **selection of games** based on the serious games classification by Ludoscience (2011), which is non-exhaustive. Ludoscience acknowledges this and invites people to recommend additions to their database online (http://serious.gameclassification.com/EN/index.html). The database does include most games mentioned in the literature used for this state of the art analysis.
- It is not always clear how data such as the **percentage of players** per sector across age categories were determined and for which time frame they apply. With regard to data gathering, it is stated that primary data were gathered via interviews with decision makers in relevant sectors and that secondary data where gathered from public sources and other external sources, which are not specified.

The first target sector considered in the IDATE report is the **education** sector. Here, we see that digital games are still distributed physically, e.g. on CD-ROMs (63% vs. 37% distributed online). They are mostly played by pre-adolescents, adolescents and young adults. They can also be found among small children and adults between the age of 25 and 35.

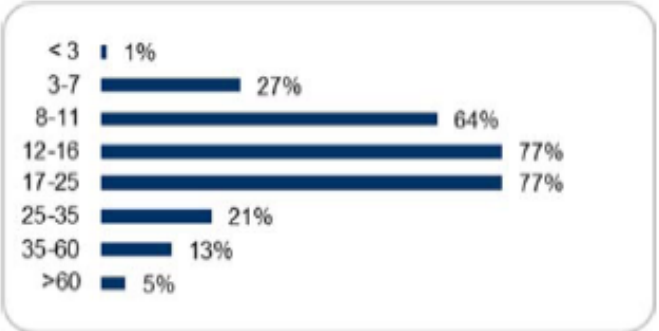

Figure 6. Percentage of players in the education sector distributed across age categories. (Source: IDATE-Ludoscience/Game Classification).

When we look at the **professional training** sector, it is clear that games are aimed at the recently graduated segment and adults of working age. However, we also see that a significant percentage of players are minors. These games are thus also likely being used

[5] English translation: Serious games: Issues, offer and market.

to prepare adolescents for their working life. Unlike games for education, games for professional training are predominantly distributed online (only 37% distributed physically). Here one could raise questions about the exclusion of people who do not have access to the Internet and who may need professional training.

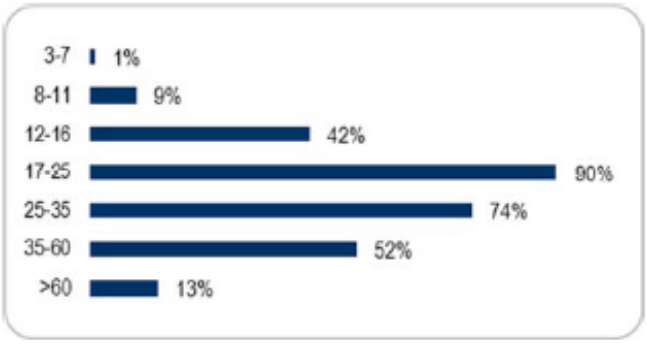

Figure 7. Percentage of players in the professional training sector distributed across age categories. (Source: IDATE-Ludoscience/Game Classification).

In the **health** sector, most of the games considered are also distributed online (63% vs. 37% distributed physically). We see that usage is spread out more across all age categories. Even amongst the elderly, we see a user percentage of about 20%.

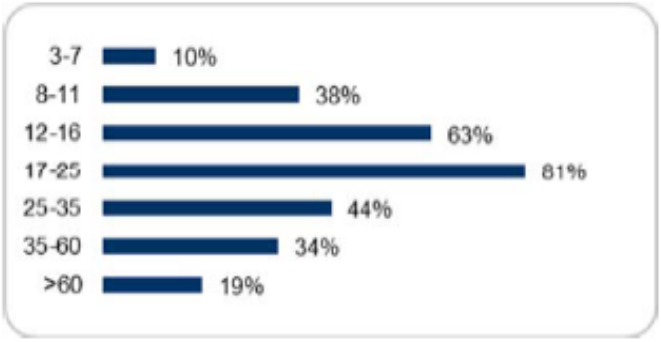

Figure 8. Percentage of players in the health sector distributed across age categories. (Source: IDATE-Ludoscience/Game Classification).

Within the **information and communication** sector, games are mostly used amongst adolescents and young adults. We also see a significant part being accounted for by children and the 25-35 age range. The elderly are underrepresented. One explanation could be found in the high number of games that are distributed via a web browser or as downloadable games (90% vs. 10% distributed physically).

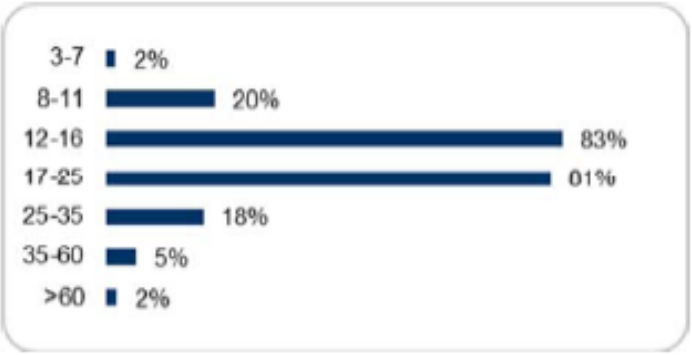

Figure 9. Percentage of players in the information and communication sector distributed across age categories. (Source: IDATE-Ludoscience/Game Classification).

With regard to the **defence** sector, games are played predominantly by recently graduated adolescents and young adults. These games also seem to be played by teens who may be attracted to a life in defence, possibly even wanting to prepare for that. The larger part of these games is distributed online (61%), with 39% being offered on physical carriers.

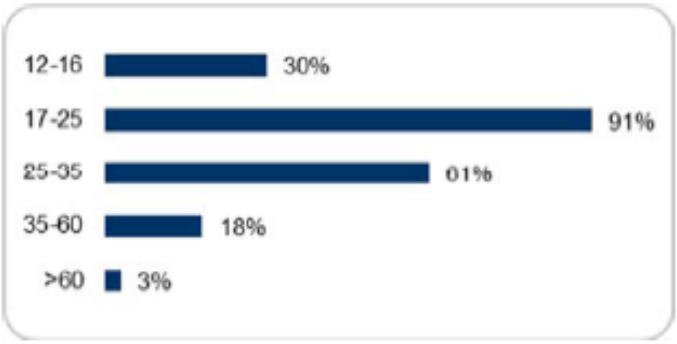

Figure 10. Percentage of players in the defence sector distributed across age categories. (Source: IDATE-Ludoscience/Game Classification).

2.5.2. Approaches to studying technology adoption

The investigation of the adoption process, its drivers and barriers has been approached in different ways. Acceptance and domestication research are two well-known approaches to theorizing and studying the adoption of new technologies that stand in stark contrast to one another.

User acceptance research seeks to identify factors that determine the adoption of a new technology. Specifically, it tries to quantitatively establish which factors (e.g. user and technology characteristics) predict the willingness to use this technology (i.e. acceptance), mostly by gathering survey data. Two core empirical models have been advanced in this type of research: The Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT).

TAM was proposed originally by Davis (1989). Based on Theory of Reasoned Action (Fishbein and Ajzen, 1975), this model represents the view that the attitude towards using a technology and the consequent intention to use it are mainly influenced by perceived ease of use and perceived usefulness. Also, according to the model, when a technology is perceived as easy or easier to use, it will have a positive influence on the perceived usefulness of this technology (Ibrahim & Jaafar, 2011), making the latter a crucial construct.

The model presented in **UTAUT** (Venkatesh et al., 2003) consists of four direct determinants whose influences on intention to use the technology are mediated by four other factors. Direct determinants are performance expectancy (cfr. perceived usefulness), effort expectancy (cfr. perceived ease of use), social influence (i.e. extent to which person feels that significant others would want him/her to use the technology) and facilitating conditions (i.e. properties of the technological and organizational context that serve to remove barriers to use). Mediating determinants are gender, age, experience and voluntariness of use.

The models advanced in acceptance research have been questioned for various reasons (see Call out box 7). Despite these limitations, the positivist approach inherent to acceptance studies dominates the literature on adoption of information technologies as demonstrated in the review by Williams and colleagues (2009). They encourage researchers to consider alternative interpretive and descriptive/theoretical approaches as well.

Call out 7: Critique on acceptance studies

With regard to acceptance research, the following skeptical arguments have been raised (Bagozzi, 2007, in Chuttur, 2009; Venkatesh, Speier, & Morris, 2002):

Behavior should not be considered as a terminal goal
Intention to use is not the sole determinant of actual use
Behavior may be influenced by factors that are not salient to the user
Focus on the individual is problematic
Models do not help us to understand non-adoption
Tends to lack a longitudinal dimension, failing to consider continued use
The original TAM model does not consider the role of intrinsic motivation, only extrinsic motivation (through the concept of perceived usefulness)

One alternative approach is **Domestication theory (Mansell & Silverstone, 1996; Silverstone & Haddon, 1996).** This approach aims to describe the process in which innovative technologies are tamed and cultivated, as they become an integrated part of one's everyday life. This process is a conservative one as people try to fit or incorporate unfamiliar technologies in their everyday lives without having to change the structure of their lives too much or without having to lose control of that structure. While it originally focused on the domestic context, it has been applied to other areas as well.

In the domestication process, the following components can be distinguished (Haddon, 2007, Silverstone & Haddon, 19962, Courtois et al., 2012):

- **Commodification**: This refers to the assignment of predefined meanings to technologies by their producers through market communication. However, it is still up to the domestic users to accept, reinforce, divert or reject these meanings. This implies the success of a technology does not depend on its properties alone, but on whether it is perceived as meaningful
- **Appropriation**: This refers to the transfer of an object from the public sphere into the private sphere. Going beyond a matter of purchase, it refers to the incorporation of unfamiliar technologies into the organization of the domestic context, giving it a place in the household's physical structure (i.e. objectification), its routines and everyday language (i.e. incorporation)

- **Conversion**: The process of conversion then refers to how these technologies are displayed to others, bringing them back to the public sphere

2.5.3. Drivers and barriers from a user perspective

In what follows, we discuss a number of drivers and barriers for the adoption of games with special attention for use of games for a purpose beyond entertainment, in general, and for inclusion and empowerment, in particular. We have consulted literature and documentation with an open mind towards the different approaches to studying adoption.

General public

The adoption of games has been addressed in a series of acceptance studies. Hsu and Lu (2004) used the TAM to predict users' acceptance of online games. They found that **perceived usefulness** instead of perceived ease of use is a crucial factor in predicting behavioural intention for playing online games. They also noted that social influence and flow experience play a significant role in user's acceptance of online games.

The social influence in Hsu & Lu's research consists of two components: **social norms**, a two-folded concept, and critical mass. Social norms can consist of an informational influence, which refers to the person accepting information obtained by other users as evidence about reality and normative influence, which refers to a person conforming to the expectations of others to obtain a reward or avoid a punishment (Hsu & Lu, 2004). **Critical mass** is defined as 'the fact that the value of technology to a user increases with the number of its adopters' (Hsu & Lu, 2004, p. 857). Using a similar approach, the perception of community characteristics such as critical mass has also been found to play a role in other online platforms as well (e.g. online vending systems, see Koch, Toker and Brulez, 2011).

Flow experience is a concept introduced by Csikszentmihalyi and refers to a state of mind where concentration is so intense that self-consciousness and sense of time fade. This state of mind can be attained during the performance of certain activities, such as sports, dancing, playing music (Csikzentmihalyi, 1990), but also by playing digital games (Hoffman & Novak, 2007; Chiang et al., 2011). Flow also affects amount of time spent using online services, influencing customer loyalty (Jarvenpaa & Todd, 1997).

Acceptance research studying instrumental use of games has mainly focused on the adoption of games used in a formal education setting. These efforts have resulted in factors being added to the original TAM or UTAUT model to enhance their predictivity in this domain.

Bourgonjon et al. (2010) added **perceived learning opportunities** as a construct to create a technology acceptance model specific for predicting adoption of commercial off-the-shelf games in schools. Perceived learning opportunities are defined as 'the extent in which a person believes that using an online educational game can offer him or her opportunities for learning' (Bourgonjon et al., 2010, p. 1147). This concept also integrates the learning process, whereas the concept usefulness puts the emphasis on performance and outcomes (Bourgonjon et al., 2010). In another study, Bourgonjon et al. found that gender effects on behavioural intention to use educational digital games are almost completely mediated by **experience with games**. Therefore they suggest that when using digital games in the classroom, students need to be familiarized with digital games (Bourgonjon et al, 2009).

Ibrahim and Jafaar (2011) present an acceptance model for educational games in which they added **enjoyment** as an extra component to the UTAUT model. Enjoyment is defined as 'the extent to which the activity of using the computer system is perceived to be personally enjoyable in its own right (Davis et al., 1992 cited in Ibrahim & Jaafar, 2011, p. 555). Like the flow concept, enjoyment can be linked to **intrinsic motivation** (discussed earlier in this report). While Ibrahim and Jafaar's model is currently unvalidated, Venkatesh, Speier and Morris (2002) did find evidence that intrinsic motivation plays a role in acceptance of information systems, albeit indirect. They found confirmation that is

enhanced by game-based training and plays an indirect role in the acceptance of information systems by increasing perceived ease of use and usefulness.

Yusoff, Crowder and Gilbert (2010) complemented the TAM model with factors such as 'transfer of learnt skills', 'learner control', 'situated learning' and 'reward'. **Transfer of learnt skills** refers to the extent to which participants felt that they could apply the skills learned in the game in everyday life**. Learner control** covers the feeling of control over the game. **Situated learning** is the extent to which the game offers a space where players have an experience that feels authentic, true to life. **Reward** finally pertains to the extent to which players feel encouraged, motivated to learn.

The domestication approach can deliver insights in the adoption of games as a social activity or as a process undergone by a social unit such as a household. It also acknowledges the role of both technology and content, and hence, can be used to consider which meanings game developers or game publishers can send out in their marketing, how and to what different target groups integrate games in their everyday life, how they give meaning to various gaming technologies and content and how they display their game possession and use in daily life.

Although not explicitly subscribing to domestication theory, much of the work in The Digital Youth Project led by Lyman, Ito, Carter and Thorne and funded by the MacArthur Foundation can be considered in this respect. The project set out to describe from an ethnographic perspective informal learning that is tied to how young people deal with new media, including digital games. In a book chapter on the project's outcomes with regard to gaming, Ito and Bittanti (2010) motivate their work as an attempt to address a knowledge gap. They observed that there is only limited research available on gaming practices in everyday life, how they are related to gender, age and class identity, and how they are part of a wide range of media ecologies and types of participation with new media.

Throughout their study, Ito and Bittanti (2010) were able to identify a number of highly diverse gaming practices ranging from playing a game to procrastinate (killing time), to engage in while having a fun time with others (hanging out), game play committed to mastery (recreational gaming), game play with a more formalized and structured social dimension (organizing an mobilizing) and finally engagement with various resources and creations surrounding game play (augmented game play). By differentiating between these genres of participation, Ito and Bittanti were able to give a more nuanced view of gaming as situated in context, finding that:

- Certain genres of game participation (recreational, mobilized and augmented game play) are more likely to form **pathways to interest-driven learning**
- We need to be conscious of **exclusion issues** with regard to gaming, as it appears that it precisely with the more committed forms of game play that divides can be observed:
    - Gender gap: Less participation of girls
    - Socioeconomic divide: Required access to high-end technical and social gaming resources
    - Generation gap: Due to the ever so fast changes in gaming technology
- **An ecological view of gaming** may be more appropriate than a focus on transfer of knowledge and skills, acknowledging that:

- Gamers often enjoy game play because they perceive it as separate from 'real life', affording a space where they can play without worrying about real-life implications
- What young people learn may not be necessarily embedded in the game's design and content
- That great value lies in a 'healthy social ecology of participation" (p.240)

In what follows, we zoom into digital technology use and gaming by at-risk groups to consider drivers and barriers that may influence game adoption and participation in e-inclusion initiatives.

At-risk groups and their difficulties to reap the benefits of digital technologies

Current digital divide studies indicate that at-risk groups face various barriers with regards to accessing and using digital technologies. At-risk groups generally lack qualitative home access to digital technologies because the **cost for acquiring new and high quality hard- and software** is often too high compared to their limited financial resources (van Dijk, 2005). In case they do have home access, chances are that the available **hard- and software is outdated** and hence, does not support the latest online tools and applications such as the most recent digital online games (Vranken & Vandebosch, 2007).

At-risk groups also tend to show a more **negative attitude towards the use of digital technologies** in general and the reasons for this are manifold. A first major issue is the **lack of digital skills**. Not having home access to the Internet prevents the trial-and-error acquisition of skills (Brotcorne, Mertens, & Valenduc, 2009; van Dijk, 2003). Button anxiety – being afraid to touch and use digital devices – is highly common amongst elderly individuals and at-risk groups (van Dijk, 2003). Low-educated employees also get fewer opportunities for in-house training at their workplace (Mariën & Van Audenhove, 2008). Gee (2007) and Brotcorne, Mertens and Valenduc (2009) refer to a so called equity crisis in traditional print literacy: members from at-risk populations show lower levels of general literacy skills which in turn negatively influences their use of digital technologies and their attainment of digital skills.

At-risk groups also mainly belong to a very **limited and highly homogeneous ICT-poor network of other underprivileged individuals** that are exposed to the same ICT-related limitations as themselves. They have many strong ties like nearby family and close friends but very few weak ties like colleagues, acquaintances or distant friends because of their limited societal participation. As a consequence, they have very few opportunities of use and lack the necessary resources to develop their usage and skills level (Brotcorne, Mertens, & Valenduc, 2009; Selwyn, 2004; van Dijk, De Haan, & Rijken, 2000; van Dijk, 2005). Additionally, underprivileged groups rarely transcend their homogeneous but familiar social network because of too many negative experiences in the past.

An additional barrier consists of the drastically limited participation in education amongst at-risk groups. According to Bianchi et al. (2006, p.41), **inequalities in accessing education** already occur during the formal schooling of youngsters: "In many European countries, school access tends to reinforce rather than reduce existing socio-economic inequalities." This inequality persists at the level of post school education opportunities: "Those that need the most post school education and training because they are unemployed or low-skilled, receive the fewest education and training opportunities" (Bianchi et al., 2006, p.41-42). Also, underprivileged groups and undereducated learners **drop out**

easier than other social groups. Low literacy levels, a lack of confidence and a lack of personal motivation increase the risk of dropping out of a course.

Participation in education is also limited because of **low levels of self-esteem and a lack of confidence** in one's proper learning capabilities. The lack of confidence becomes more prominent as age increases, education level is lower or learning difficulties are more present. Moreover, the older an individual gets the less confidence he has in his intellectual capabilities and the more he considers learning as problematic (Tyler-Smith, 2006). People with learning difficulties, limited literacy levels or inadequate background knowledge also often lack a **rationalized and self-motivating attitude** (Vlaamse Onderwijsraad, 2006). Consequently, at-risk groups tend to reject formal education as such. Hence, informal and non-formal learning and training opportunities could be a way of re-engaging at-risk groups by overturning their negative experience and emotions associated with learning (Mariën et al., 2010). In this regard, using **digital games for learning** might be a suitable approach because they could allow individuals to learn without being aware of it.

The occurring differences in the quality of access, the attainment of skills, motivational and other barriers lead to differentiated usage patterns between individuals and specific population groups. Witte & Mannon (2010, p. VIII) highlight a crucial implication: "The digital divide" is **not only about access** to technology; increasingly important is that it's **also about the plethora of ways we use technology and the consequences of that use**. How do these patterns exclude segments of the population from the social, political, and economic potential of the Internet?"

Hence, the so-called **Matthew effect** comes into play. Already advantaged groups – those with high education levels, high incomes, active job status and various training opportunities – are able to use digital technologies in such a way that it gives them a significant added value and as such, continuously enables them to improve their societal position. This in contrast to underprivileged groups – those with low education levels, low incomes, inactive job status and few training opportunities – who show a more leisure-oriented use of digital technologies (e.g. games and chat) without an immediate added value at a societal level (van Dijk, 2008).

As Steyaert & Gould (2009, p.747) state: "Given these differences in content preferences and the impact of types of information behaviour on school results and other socially desirable results, it becomes clear that digital exclusion changes into an **information divide**. The medium is no longer the most critical element; information behaviour becomes the main driver of the influence of digital technologies on social exclusion." This raises ethical issues: Is the digital divide consequently a private, individual responsibility and no longer relevant to social work? As well as professional issues: Which are the appropriate social interventions to use?

Usage patterns of at-risk groups: Leisure and game-oriented

The fact that differences in usage between low and high-income groups exist does not imply that digital games might not serve as an approach to strive towards the inclusion and empowerment of at-risk groups. General data on **usage behaviour** indicate that **at-risk groups**, and especially young people at-risk, show a more **leisure-oriented use** of the computer and the Internet (Royle & Colfer, 2010; van Dijk, 2005). Similar results are shown in the Ofcom children's survey. In the UK, over 80% of the children aged 5 to 15 are using

some kind of gaming device and 23% of the children aged 12 to 15 are using their gaming console to access the Internet (Ofcom, 2011).

Research in the US highlights that 83% of the American teens have at least one game console in their home and that low-income teenagers are more likely to play cell phone videogames than their high-income peers (Ortiz, 2009; Steinkuehler et al., 2009). Research by Karabanow and Naylor (2010) indicates that a vast percentage of homeless youngsters engage frequently with digital technologies, mainly to use email and play games. The same goes for NEET (cf. young people not in Employment, Education or Training) who use pay-as-you-go mobile phones for social networking, games and music (Royle & Colfer, 2010). When considering the type of games, young people from minority groups tend to focus more on adventure, sports or fighting games whereas their white peers engage more easily in complex multiplayer games (Ortiz, 2009).

Research shows that gaming is seen as a part of the culture of at-risk groups, especially with regard to young people at-risk who tend to be more present in informal social spaces than in formal learning environments. The fact that at-risk groups naturally have a gaming culture and show extensive gaming behaviour implies that digital games carry more opportunities for the digital inclusion of at-risk groups than other ICT. Access is less of an issue because many at-risk youngsters have one or more games consoles (Royle & Colfer, 2010). The motivational barriers that accompany general ICT are lowered in case of digital games, as the intrinsic motivation to play games is already present. Also, the rejection of formal learning is overthrown as learning through digital games often happens unknowingly and in an informal manner.

As such, the assumption is made that a **digital games strategy for inclusion could potentially be successful for youth at-risk**: "Games consoles (most now online and browser capable) would appear to be a natural conduit for reaching both engaged and disengaged teens. Likewise, social networking sites and social gaming and the casual gaming opportunities presented by mobile access have equal appeal." (Royle & Colfer, 2010, p.9) The same assumptions arise with regards to mobile platforms. Figures indicate that the use of mobile platforms and devices by young people has significantly increased. Hence, policies that aim to develop skills amongst youth-at-risk should also entail these opportunities (Haché & Cullen, 2009).

A major issue however is that **little research** exists **on the actual and successful use of digital games by at-risk groups for broader inclusion or empowerment goals** (Ortiz, 2009; Royle & Colfer, 2010). Or, as Ortiz (2009, p.4) mentions: "The challenge is, precisely, to be able to tell when, and under what conditions, broadband-enabled games such as MMOGs can contribute to development for marginalized communities in the information society". Hence, **more qualitative research** on the overall gaming behaviour and the detailed characteristics of usage patterns of at-risk groups is needed in order to determine the most appropriate approach for implementing digital games (Haché and Cullen, 2010).

Future research should focus on collecting data on the different consoles that at-risk groups possess, the various games they play; their use of mobile games; and their engagement in social networking and communities of practice (Royle & Colfer, 2010). Also, particular market segments of at-risk groups need to be defined and analyzed in order to determine a successful publishing and engagement strategy (Ortiz, 2009). And while the positive influence of games is assumed, additional research is needed on the sustainability

and long-term character of the factual transition from exclusion to inclusion. Can digital games really act as an agent for change or do they just lead to short-term changes in behavior (Karabanow & Naylor, 2010)?

Moreover, a strong research focus is needed on the cause-effect relationships between digital and social inclusion, but also on the offline and online realities and how these relate to the usage behaviour and the social in- and exclusion of at-risk groups. Or as Mehra, Merkel and Bishop indicate (2004, p. 799): "In order for the internet to play a greater role as an instrument for social and personal empowerment, we need to understand what the everyday life of an individual belonging to a minority or marginalized community encompasses. Such an approach calls for closer examination of the practices, system of relations and context of particular minority and marginalized users in order to figure out what is meaningful to them and how they use (or do not use) different forms of the Internet for meeting their objectives."

From exclusion to inclusion and empowerment: the role of the third sector

Research by Haché & Cullen (2009) points out the importance to ensure that the use of digital technologies, or digital games in particular, is framed within a suited **pedagogical, trustful and meaningful approach**. Because of the complexity of the social reality of at-risk groups, developing digital game based approaches need to be done thoroughly based on (1) the actual game culture and digital habits of the targeted groups; (2) the social structures and activities in which the targeted groups participate; and (3) a future oriented focus towards employment and additional training opportunities (Royle & Colfer, 2010; Steinkuehler et al., 2009). In other words, it is crucial to integrate digital game based approaches in overall inclusion and empowerment strategies and to ensure they are embedded in existing initiatives and approaches (Karabanow & Naylor, 2010). This means that in order to obtain sustainable results, a **project-based approach** is needed in which the use of digital games is situated within an overall approach for inclusion. At-risk groups should hereby be considered as people with assets and skills, meaning as people that have knowledge and can contribute instead of approaching them as a problem to be solved (Royle & Colfer, 2010).

Third sector organizations (for example neighbourhood centres, poverty organizations, local women's organizations, telecentres…) play a crucial role for the digital and social inclusion of at-risk groups (Gigler, 2004; Haché & Centeno, 2011; Mariën et al., 2010). According to Haché & Centeno (2011) the impact of third sector organizations is fourfold: (1) they enhance and support e-inclusion by addressing the different barriers that occur at the level of access, motivation and skills; (2) they stimulate the empowerment of users and the intermediaries by enabling the formal and informal development of competences; (3) they act as a social inclusion agent by focusing on the development of social capital and by addressing various needs of at-risk populations; and (4) they are a catalyst for social innovation because of their bottom-up dynamics and self-organization in which users and communities are placed at the centre.

The **added value** of intermediary organizations is confirmed in the Digital Literacy European Commission Working Paper (2008, p.16): "Benefits are best transferred through intermediaries who are well acquainted with the target group and know how best to motivate them." A recent study by Haché & Cullen (2009, p.9) emphasizes the importance of the role of intermediaries: "The need to take into account the role and importance of "human intervention" (intermediaries and multipliers) is possibly the one common finding

and strongest recommendation of all the reports currently available. The experts agreed that the use of digital technologies alone does not translate into the social inclusion of youth-at-risk." **Intermediaries** in this regard refer to the professionals working with at-risk youth (cf. youth workers, social assistants, teachers, health workers...). **Multipliers** need to be seen as the informal contacts of at-risk youth, meaning family members, intimate friends, neighbours and so on (Haché & Cullen, 2009).

However, in spite of the obvious beneficial character of third sector organizations for empowerment and inclusion, little empirical evidence exists of their actual impact. In his recent study, Steyaert (2010, p.22) puts a number of questions regarding evidence-based practices to the fore: "At the intersection of these developments lies the issue of **whether e-inclusion interventions are effective, of whether they reach their aim**. It is common to label projects as "good practice", but do we have an assessment framework to justify using labels such as "good"? Does providing excluded citizens with access to computers and the Internet indeed help them to become socially included? And can we distinguish different types of initiatives and assess them according to their effectiveness?" Steyaert (2010, p.28) continues by criticizing the use of the label 'good practice' to refer to the presumed added value of existing initiatives: "It is strange to observe that most e-inclusion initiatives have not been evaluated beyond a project description to satisfy the funder's information needs ... the absence of evaluation data implies little assessment of quality of e-inclusion initiatives is possible".

Research by Mariën et al. (2010) identified different **aspects that hamper such assessment mechanisms**. First, assessment implies monitoring the progress and evolution of digital skills of participants, which means that the skills level of participants needs to be determined before and after each accomplished course. Third sector organizations do not necessarily have the financial means or manpower to do so. Also, organizations mainly apply a demand driven approach and as such, have no clear idea what should or should not be measured or registered.

Currently, organizations are convinced of their impact because of noticeable changes in the daily lives of their at-risk visitors. However, this impact remains anecdotic. Considering the possible impact of e-inclusion initiatives means that one has to reflect on how and to what extent e-inclusion initiatives have led to the improvement of participants' social position? Organizations state that quantifying or measuring effective progress is difficult because e-inclusion is never the sole cause of social inclusion what makes it difficult, yet impossible, to make abstraction of the impact of e-inclusion. A representative from an NGO working with youth-at-risk states it as follows: If someone is now making websites for a living, and you can say that once that person got his first Windows lessons in an organization, so they are partly responsible for this evolution, but the question remains for what percentage? In order to counter this lack of data, Steyaert (2010, p.28) states it is "a challenge to the myriad of e-inclusion initiatives to make evaluation a critical ingredient of their work, and not just an element in the reporting requirements of the funders".

It is also important to consider that the policy driven push towards empowerment and inclusion — complemented by assessment strategies trying to quantify impact — **might have perverse effects**. Fear exists that, at the end, impact assessment will lead to financing mechanisms based on output, which will put pressure on organizations to justify their social return of investment and the need to implement a cost and benefit approach. Which individual is worth investing in, because easier to get digitally and socially included,

and which one is not? Needless to say that in this case, the weakest individuals, who are the ones that are the most difficult to engage in learning and to get socially included, will be the first victims (Mariën et al., 2010).

From exclusion to empowerment: avoid wishful thinking

An important aspect to consider is the fact that different stakeholders have **different goals and expectations with regards to inclusion initiatives**. Policy makers see in e-inclusion policies and initiatives ways to improve and develop the digital skills of at-risk groups and to work towards their **empowerment and social inclusion**: "Learning objectives such as social and political competence, critical thinking, knowledge sharing and cooperation techniques are essential preconditions for participation and well-being in the knowledge society. All these capabilities are intimately linked to communicative, media and social competence, which must be nurtured through learning. It would be beneficial for inclusion policies to focus on these empowerment goals" (Bianchi et al., 2006, p.44).

For at-risk groups, however, most learning is not considered the main goal, but instead, is more likely to take place in a very informal manner alongside other activities (Ala-Mutka, 2010). The cultural disaffection and attitude that is present amongst a part of the at-risk population might also hamper the take-up of digital game based initiatives for learning, inclusion or empowerment: "Some young NEETs are from workless families where they represent the fourth generation living on benefits. For these young people, there may be no expectation or aspiration to work. In these circumstances, the idea of re-engagement with education and learning is a more foreign concept, and not something which is supported by their family or social circle." (Communities and Local Government, 2008d, p.17)

When considering intermediary organizations, individuals at-risk are more likely to visit these organizations in order to meet other people, consult social workers, or in case a public computer space is integrated in the organization, to play games, chat, listen to music or watch videos or for example learn how to use Facebook than to directly obtain social inclusion or empowerment oriented solutions. Consequently, and because of the highly complex and problematic real-life situations of at-risk groups where digital exclusion is just a minor problem amongst many others as housing, schooling, employment or health, the main goal of e-inclusion initiatives is to incite and stimulate the use of digital technologies (Mariën et al., 2010; Vranken & Vandebosch, 2007). An important implication is that in reality most e-inclusion initiatives are compelled to focus on the acquisition of basic skills (cf. button knowledge) and the creation of positive learning or life experiences instead of pushing towards the (f)actual inclusion and direct empowerment of at-risk groups.

In summary, it can be stated that the complex relation between at-risk groups and the use of new media and digital tools for empowerment and inclusion is determined by four often interrelated issues, namely (1) digital divides; (2) social network barriers; (3) learning divides; and (4) the multidimensional character of social exclusion.

2.5.4. Drivers and barriers from an intermediary perspective

Adoption by intermediaries in formal learning settings

In a study on Flemish secondary schools, De Grove and Van Looy (2011) investigated factors influencing the decision to integrate digital game use in a classroom context. They observed that gender and number of years experience in education were not determining factors. Instead, a **perceived fit** of digital games with the curriculum in general and the

structure of classes seemed to play an important role. When teachers saw games as more compatible to their teaching practices, they also tend to see more **learning opportunities**, felt more that games would be **easy to use** in the classroom (which referred to being able to handle the game as well as putting it to use) and would be more **useful** in that context.

Hence, De Grove and Van Looy conclude that **game-based approaches in the classroom could be stimulated in two ways**. On the one hand, teachers could be offered more experience with games as part of teachers' professional development. On the other hand, more work could be done on enhancing the compatibility of games and the education curriculum and structure of lessons. This could be accomplished in special-purpose games by taking functional and structural constraints of education into account, or by focusing on the constraints instead and thinking on how the educational system could be changed to accommodate the use of games.

Implementing games for inclusion in a non-formal learning context

Several barriers might hamper the take-up of digital games for inclusion by intermediary organizations. First, studies show that a vast number of intermediary organizations are reluctant to integrate digital technologies in their service delivery because a significant part of their employees shows a negative **attitude towards the use of digital technologies** and additionally lacks the necessary operational and heuristic skills to use digital tools or stimulate others to start using digital tools (Mariën et al., 2010; Steyaert & Gould, 2009).

Though empirical data are lacking, it might be expected that a similar negative **attitude** exists **towards the use of digital games**, caused by the highly informal and playful character of digital games. Consequently, an crucial step is to (1) convince intermediaries of the added value of games or other digital tools for empowerment; (2) develop awareness and know how on how to use digital tools for inclusion and empowerment or other participatory goals and, moreover, integrate the use of digital technologies as a tool into the existing curricula of librarians, social workers or youth workers, as they are most likely to function as an intermediary for e-inclusion policy; and (3) invest in train-the-trainer opportunities that focus on the attainment of digital skills (Mariën et al., 2010).

Second, the majority of third sector organizations have limited **financial resources** because they are subject to project-based funding. They already lack the financial strength to update their digital equipment, provide professional teachers or organize in-house train-the-trainer sessions (Mariën et al., 2010). The lack of financial resources additionally has a perverse effect on the sustainability and the long-term approach of e-inclusion. Currently, organizations are compelled to develop their programs and approaches in line with the consecutive project calls in order to get financing, which hampers the development of a long-term plan for e-inclusion. Also, the loss of funding forces a vast number of initiatives every year to close, irrespective of their success and impact (Mariën et al., 2010). The lack of resources makes the acquisition of digital games or the investment in the development of games nearly impossible. A solution might be to find more ways to stimulate the collaboration and enhance public-private partnerships between the game industry and third sector organizations.

Third, the increased focus of policy makers on empowerment and inclusion goals puts intermediary organizations in a **contradictory situation**. Brants & Frissen (2003, p.8-9) explain the pressure that third sector organizations encounter: "Inherent in the in/exclusion dichotomy is that being socially excluded is defined as bad and inclusion the preferred

state of being, worth striving for and putting an effort into. Emphasizing human agency runs the risk that inclusion will not only be seen as a right, but also as an obligation: empowerment as an opportunity to participate is propagated as a necessity to be active too."

Hence, third sector organizations working with at-risk groups feel compelled to focus on the stimulation of different types of capital-enhancing activities because such usage behaviour is more likely to contribute to opportunities of social mobility (Hargittai & Hinnant, 2008; van Dijk, 2005). But the strength of third sector organizations lies in their user-centred and learner-oriented approach by which the issues raised by at-risk groups are valued and addressed (Mariën et al., 2010). The usage behaviour of at-risk groups tends to be more towards leisure-oriented tools and applications (van Deursen & van Dijk, 2009).

This implies that third sector organizations are forced into a **push and pull** situation between the wants and needs of at-risk groups and the expectations of policy makers and funding organizations. Pushing a certain type or tool amongst at-risk groups in a top-down manner might cause rejection and result in drop out. Not pushing capital-enhancing activities enough might make policy makers and funding organizations accord less value to the activities of third sector organizations.

Acknowledging the crucial role of intermediaries: participatory approaches

Different studies acknowledge the value of **participatory approaches** as a possible means to move beyond what Bianchi et al. (2006) call the first wave of access-centred e-Inclusion initiatives and work towards the effective empowerment and participation of at-risk groups (Sime, 2008; Sinclair & Bramley, 2010; Steyn & Johanson, 2011; Teles & Joia, 2011). According to Olshansky (2008, p.274) "vulnerable populations often lack a voice in regard to what they need and to how these needs could best be met". Sime (2008) states that the involvement and consultation of at-risk groups in activities, increases their sense of agency, values them as full partners and hence, challenges the hopelessness and unchangeable nature of their precarious situation. This is confirmed throughout the research of Sinclair & Bramley (2010, p.7): "Increasing the number or proximity of public internet access points is at best only a first step in addressing digital exclusion. To increase actual uptake, such access must be combined with appropriate community informatics strategies; that is, actively engaging communities in using ICTs for social, community and other purposes which they value."

Teles & Joia (2011) refer to the virtuous cycle of participation and empowerment and state that enabling participants to give feedback during the implementation process of IT-tools will lead to an increase in the number of new participants and an augmented sense of citizenship and empowerment amongst these participants. The importance of involving individuals and communities is also stressed by Steyn & Johanson (2011, p.60): "The main goal is allowing those communities and individuals to re-appropriate discourses, practices, contents, equipments and networks constitutive of 'digital inclusion' process by themselves. Participatory approaches stress the importance that communities must be able to transform these elements for the benefit of their own needs, with actual autonomy".

An important question then is how to develop participatory approaches on digital games for empowerment and inclusion? In this regard, lessons can be learned from **participatory research approaches with at-risk groups.**

Liamputtong (2007) mentions the idea of participatory action research where participants are enabled to identify the different issues that have an impact on their lives, families and communities and hence, determine the aspects to be tackled during the research process. Sime (2008) refers to research in which at-risk individuals were given the opportunity to identify priorities and formulate collective solutions. In studies realized by Platt et al. (2006) at-risk individuals were actively involved as indigenous field workers and were asked to collaborate on the design and approach of the research methodologies and the effective gathering of data via face-to-face interviews.

Olshansky (2008) refers to community-based participatory research (CBPR) as a possible approach. She indicates a number of basic principles for community involvement such as building on the strengths that are already present within the community; the use of an iterative process; the continuous facilitation of collaboration throughout the entire process; and the integration of knowledge acquisition with an action-based approach (Olshanksy, 2008).

Warren (2007) mentions the importance of ownership and appropriation; locally relevant content; language and cultural pertinence; and user-centric technology that fits the needs and wants of the target group. Translating this to the context of inclusion and empowerment via digital tools means that digital inclusion policies should (1) acknowledge the role of intermediary organizations as a means to reach and empower at-risk groups; and (2) reflect on a participatory approach that integrates the knowledge, experience and network value of these intermediary organizations and their at-risk participants.

Adoption, implementation and usage – General observations

Considering the **usage of special-purpose games**, based on the data of the IDATE report, we see that

- The **Education** and **Professional training sector** together cover the different age categories, the former catering particularly to (pre-)adolescents and young adults, the latter to those just graduated or already in work.
- Usage is most spread out across different age categories for games played in the **Health** sector
- Usage in the **Information and communications** sector where games are predominantly distributed online, elderly are underrepresented
- In the **Defense** sector most games are played by those interested in the military, personally or professionally, particularly adolescents and young adults.

Different approaches are being applied to investigate adoption, the factors that shape it and the process itself. Positivist approaches appear to be more prevalent in this respect. More research is needed on gaming practices in everyday life, how they are related to gender, age and class identity, and how they are part of a wide range of media ecologies and types of participation with new media is.

When we consider **adoption of games by the general public**, it has been found that

- Role of social norms and critical mass: People are more likely to adopt online games if they feel this is expected from them by others and when they feel that many other have done the same
- Enjoyment/flow: Not surprisingly, people are more willing to play a digital game that they find enjoyable in its own right (cfr. intrinsically motivated game play). The activity may be so absorbing that people's sense of time fades (i.e. flow).
- Perceived learning, situated authentic learning: People are more prone to play a digital learning game that they feel will actually allow them to learn, and that sets the game experience in a game space that they can relate to
- Control, encouragement and gaming experience: People are more willing to play a digital learning game when they feel encouraged to play and have experience with playing digital games
- There are less- and more-committed genres of game participation: The latter seem to be more likely pathways to interest-driven learning, but are also those where exclusion issues arise (gender and generation gap, socio-economic divide)

Adoption, implementation and usage – At-risk groups

With regard to at-risk groups,

ICT adoption is shaped by access issues, but also usage issues resulting in a negative attitude towards ICT. Barriers include:

- Limited home access: No or outdated hardware and software at home due to the cost of obtaining them
- Lack of digital skills: Limited opportunity to practice and build up new media literacy
- Network poverty: Limited access to material, cognitive and social resources within the social network that people are part of
- Negative experiences and associations with formal learning settings: At-risk groups tend to avoid public computer spaces or training facilities that are linked to formal institutions

This **digital divide** is accompanied by structural mechanisms of social exclusion. Underprivileged groups who have difficulty dealing with ICT run the risk of become further disadvantaged in terms of employability, health and civic participation.

We see that **access and continued participation in education and training** is shaped by:

- Personalized guidance, mentoring or tutoring
- Language support
- Personal issues: such as low confidence and negative school experience

With regard to game adoption, we see that there is access to, interest in and usage of digital games (online and mobile) by at-risk groups. While digital games could be used to address the digital and learning divide just mentioned, we need to be aware that these divides also constrain what kind of approach will be suitable.

The challenge lies in developing approaches that really connect to their world. It appears that to achieve this, the key lies in following a project-based or integrated approach:

- That is accompanied by in-depth research into gaming practices of at-risk groups: what are they playing, how, where, when and so on.
- That carefully frames the game, as 'serious labels' may give the feeling to the target group that they are being labeled
- That combines the added value of games with that of intermediary organizations who have a trust relationship with the target audience and guide them*

*While several have argued that intermediary organizations have an important role, the assessment of that appears as challenging as the assessment of the role of games.

Adoption, implementation and usage – Intermediary organizations

Formal learning settings

Factors shaping adoption of game-based approaches in the classroom:

Compatibility between digital games and curriculum/class structure
Perceived learning opportunities
Ease of use (both of the game and of the implementation)
Perceived usefulness

Two approaches to stimulate adoption of game-based approaches by teachers:

Offering experience with games through professional development
Enhancing compatibility between digital games and existing educational structure

Non-formal and informal learning settings

Factors shaping adoption of game-based approaches in non-formal and informal learning settings

Attitudes towards ICT and gaming
Financial resources for game acquisition, training

Opportunities to stimulate adoption of game-based approaches in this context:

Raising awareness of the potential of digital games for inclusion and empowerment
Promoting knowledge of how to integrate digital media and games in existing practices
Investment in digital skills training of intermediaries
Public-private partnerships: Between game developers and intermediary organizations
Participatory approaches: Acknowledging the role of intermediary organizations as a means to reach and empower at-risk groups; and (2) reflect on a participatory approach that integrates the knowledge, experience and network value of these intermediary organizations and their at-risk participants.

2.6. Exploring the impact of digital games

The willingness of organizations and people to adopt digital games for empowerment and inclusion depends, as we have discussed, on whether they believe such an approach to be effective. Research that specifically addresses the impact for at-risk populations is rare. However, when we broaden the scope, we can see that there is research that has explored the relationship between digital game play on the one hand, and civic engagement, health and well-being, and employability on the other hand. In what follows, we highlight studies that have investigated the impact of digital games in each of these areas (resp., Section 2.6.1, 2.6.2 and 2.6.3). We conclude with some methodological and practical reflections on impact assessment (Section 2.6.4).

2.6.1. Promoting civic engagement

Several authors have suggested a positive link between being able to function in a game as a political actor, getting experience with simulations of political systems on the one hand and civic engagement on the other hand (Jenkins, 2006b; Gibson & Levine, 2003; Kahne, Middaugh & Evans, 2008). These studies use different methodologies which deserve further attention as the methodology used has direct implications for the conclusions that can be drawn.

The methodology used in the study by Kahne, Middaugh & Evans (2008) was a phone survey among 1,102 adolescents between the age of 12 and 17 in the United States. The Gaming and Civic Engagement Survey of Teens/Parents explored civic interests and activities and focused on the following civic outcomes: 'Searching for information about politics online', 'Volunteering in the last 12 months', 'Raising money for charity in the last 12 months', 'Persuading others how to vote in an election in the last 12 months', 'Staying informed about politics or current events during the last 12 months', 'Protesting or demonstrating in the last 12 months', 'Expressing a commitment to civic participation' and 'Showing interest in politics'.

The study by Kahne et al. found a positive relationship between game play and civic engagement. However, as Kahne and colleagues themselves admit, this type of (cross-sectional) research cannot prove a causal link, i.e. it cannot tell if game play has made participants more civically active or that more civically active youth simply prefer games dealing with political themes.

A study design that is able to overcome this limitation and confirm causal links between certain behaviours is longitudinal research whereby multiple measurements can be compared over a period of time. One such study is that by Neys, Van Looy, De Grove and Jansz (2012) which looks at the long-term effects of playing Poverty Is Not a Game (PING) on civic engagement and which found that particularly in the area of social facilitation, the game was successful, i.e. over two thirds of the players indicated after three months that they talked to friends about the game, encouraged them to play or discussed the topic of poverty. For more information on this and other research regarding PING, see the case studies section.

Qualitative research into the role of digital games tends to reframe the issue of impact, focusing more on matters such as the situated nature of game practices (see work of Ito and Bittanti, 2010, discussed earlier) and the dynamics that accompany the introduction of a game to a particular setting such as the classroom. Squire and Barab (2004), for instance, investigated the appropriation of the commercial game Civilization 3 in a school environment through observations and interviews. They found that once the children discovered they could explore power dynamics and reverse history, they became more engaged to learn about basic geographical and historical facts they had no prior knowledge of. The social context in which game play was set - players were extensively guided by adults – probably also played a role in the civic learning that was observed (Squire & Barab, 2004; Kahne, Middaugh & Evans, 2008).

2.6.2. Stimulating health and well-being

Attitudinal and behavioural changes

The effectiveness of digital games in obtaining particular outcomes has also been explored through experimental design. Well-documented cases of this approach can be found in the **health sector**. To assess effects on attitudes and behaviour, most of these studies compare an experimental group that played a game for a certain period of time in a certain context (classrooms, at home, labs, etc.) with groups that are subject to an alternative approach, and/or a group that did not participate in anything.

Attitudinal and behavioural measures can be collected prior to and following participation in various ways: through questionnaires (Lieberman, 2000), interviews (Olivera, Cherubini & Oliver, 2010), observation and monitoring (of physical activity for example) and the use of

diaries to expose changes in behaviour (Baranowski, 2008) and the performance of tasks to test changes in skill levels (Cromby et al., 1996).

Most research in this area shows positive relationships between playing these games and a change in behaviour or attitude. Games to stimulate healthy eating amongst children and adolescents, for example, show a higher fruit and vegetable intake (Baranowski et al., 2008). Games stimulating medication intake (Olivera, Cherubini & Oliver, 2010) and disease management in general also showed significant differences between the experimental and control groups (Lieberman, 2000).

Improving cognitive abilities

Another study conducted amongst elderly compared an action digital game and a game especially aimed at improving cognitive abilities (Boot et al., 2012). Respondents were asked to play one of the two games for 60 hours over a period of three months. Games used were the action digital game Mario Kart (Nintendo) and the brain fitness game Brain Age 2 (Nintendo). The authors had chosen to compare a special purpose brain training game to a commercial action digital game, because previous research has shown that digital games offer the opportunity to improve perceptual and cognitive abilities (Green & Bavelier, 2008).

Participants filled out a questionnaire measuring various perceptual and cognitive abilities, game experience and training expectations before and after playing the games for three months. Results showed that the action digital game had no effect on perceptual and cognitive abilities. The effects of the brain fitness game were also minor. Furthermore, the participants who played Mario Kart found less enjoyment in playing the game compared to those who played the brain fitness game. Boot et al. (2012) suggested that in further research game preference should be taken into account.

Skill training in simulated environments

Many digital games allow the player to navigate and communicate with each other in a virtual environment. The anonymous nature of these environments is believed to make the players feel more equal to the other people present in the virtual environment, allowing them to overcome barriers that otherwise would occur in the real world (McComas, Pivic & Laflamme, 1998). In virtual environments immediate feedback can be given (Rizzo et al., 1998), which is also a general characteristic of games (Clark, 2007: Baranowski et al., 2008). Another useful element is that the virtual environment can be 'paused' to make room for discussion and give some extra information (Rizzo et al., 1998). For those with disabilities, simulation can afford a sense of independence and control (McComas, Pivic & Laflamme, 1998).

In experiment with adolescents who have a learning **disability** (Cromby et al., 1996), one group of adolescents first practiced a shopping task in a simulated environment, while another did the same in an actual shop. After practicing, the former group needed significantly less time to pick up a list of products in an actual shop and put more correct items in their cart than the latter group. The authors warn that to create an effective simulation, a balanced level of detail is required. When too much detail is integrated, the participant may not be able to generalize it to other settings. However, enough detail should be included so that the participant can actually practice the skills and use them in real-life settings.

2.6.3. Facilitating education and employment

Language learning

Another area that shows promise for the use of digital games is language learning. De Grove, Van Looy and Mechant (2011) explored game experience and perceived learning among adults playing games for **language learning**. Three games were used for this study, including two special-purpose games that explicitly aim at teaching German and one commercial point-and-click adventure game. All 62 participants played the three games. After each gaming session, participants completed a short questionnaire in which game experience, perceived learning, attitudes towards learning games, gaming frequency, and German proficiency were measured. Results show that the commercial game fostered a more positive game experience and higher perceived passive learning than the educational games leading to the observation that production value is a strong predictor of learning experience. However, differences in perceived learning and game experience disappeared when gaming frequency was held constant, which suggests that non-game specific factors are responsible for the variation that was found.

Professional training

A meta-analysis by Sitzmann (2011) evaluated the effectiveness of computer-based simulation games used for professional training comparing data from 65 samples including over 6000 trainees. The study showed that declarative knowledge, procedural knowledge, retention and self-efficacy were higher in the simulation game group in comparison to the control group (Sitzmann, 2011). It also showed that learning was higher when participants interacted with the learning material rather than having it explained to them via text or audio. Learning work-related competencies was also higher when trainees could play as many times as they desired. A third determinant that led to an increase in work-related competencies was the integration of the game in an instructional program.

It is important to note that in her study, Sitzmann found that published studies reported higher effectiveness than unpublished studies, which is in line with a publication bias for reporting positive research outcomes.

2.6.4. Further reflection on impact studies

In-game assessment

While the previously discussed studies turn to out-of-game measurements to collect evidence on the role or effectiveness of digital games, in-game measurement has been proposed as a more suitable alternative. By looking at actual in-game behaviour, not self-reported behaviour, in a hidden rather than explicit way - referred to as **stealth assessment** - it is a potentially more valid, reliable form of assessment that does not require disrupting the flow of game play (Shute, Rieber, & Van Eck, 2012).

However, as Shute, Rieber, and Van Eck point out, in-game assessment requires a rethinking of traditional ways of gathering and analyzing data. Players conduct a series of actions through the game, what should be considered, how should such a stream of evidence by dealt with? The authors refer to **evidence-centred design** (ECD) as a way of designing assessment into the game. Basically, ECD is about identifying what needs to be assessed (competences), determining what game-behaviours would be demonstrative of these competences (evidence), and defining the in-game situational properties that will trigger these behaviours (tasks). As in-game collection and analysis following this approach can be

automated, it may also reduce the barrier for intermediaries to use games in a context where assessment is required (Shute, Rieber, & Van Eck, 2012). In the aforementioned 2009 Games for Change workshop, Shute did not it may be challenging for this approach to also address sufficient attention to unexpected behaviours that are also interesting in the light of desired outcomes (Diamond & Culp, 2009).

Assessing impact on project-level or societal level

The previously discussed research mainly considers impact assessment of a particular game on an individual level. However, digital games for empowerment and inclusion are often part of a wider project, embedded in an integrated approach.

Within a project, the task of selecting an appropriate means of assessment is quite challenging. In the Assessment Workshop conducted at the 2009 Games for Change conference (Diamond & Culp, 2009), participants noted that the assessment outcome often has to accommodate multiple stakeholders who have highly different needs. Selecting the appropriate level of assessment and types of outcomes to assess then becomes a daunting task. This is particularly the case in non-formal and informal settings where it becomes more difficult to systematically collect data and to draw conclusions on the relationship between game play and attitudinal and behavioural change.

Call out 8: Assessment of games and game-based initiatives

Approaches to assess the impact or effectiveness of games and game-based initiatives differ significantly with regard to the following aspects:

1. **Data collection**: Gathering of evidence can occur through surveys, observations, interviews, additional tasks or tests, possibly but not necessarily as part of an experimental set-up
2. **Operationalization of effectiveness/impact**: Assessment may be guided by specific objectives. This may involve establishing whether a desired outcome has been reached, or whether the game-based approach was more successful in obtaining a specific objective than an alternative (non-)game based approach. On the other hand, assessment may be more exploratory, seeking to establish any form of empowerment taking place
3. **Timing of assessment**: Assessment may take place in-game, immediately after game-play (possibly combined with a pre-test), or after a longer period of time has passed. Assessment can take place at a single occasion or at several points in time (as part of a longitudinal study)
4. **Level of assessment**: Impact can be considered at different levels: the level of the individual or group of people participating in the game, at project-level in which the game may be only one component of an integrated approach, at community or societal level
5. **Assessor**: Assessment may be conducted by those implementing the game(-based initiative), as well as by those participating in it.

One way of reconciling different stakeholder views and managing stakeholders' expectations when developing games to obtain social change is to define a **'theory of change'** at the start of the project, which can inform both design and assessment (Stokes, Seggerman and Rejeski, 2006; Swain, 2007). A theory of change is "a holistic process for identifying intended outcomes that is built around a pathway of change and describes the social "interventions" that will bring about those outcomes. Each intended outcome in the pathway is associated with a specific intervention, which reveals the typically complex web

of activity that is required to effect change" (Swain, 2007, drawing from the Theory of Change website: http://www.theoryofchange.org/about/what-is-theory-of-change/).

Stakeholders looking to maximize effectiveness of the use of digital games may also benefit from being able to consult **best practices**. One example, in this respect, is the following website: http://workingexamples.org initiated by Gee, where people can describe their experiences related to a certain project and thus share the lessons they drew from it.

Finally, for assessing the impact of digital games on a wider scale, stakeholders could also consider looking at how this issue has been dealt with in other media. For instance, **public value assessment** that has been applied in public broadcasting aims to establish whether it delivers good value in return for the efforts and investments made (Coyle and Woolard, 2010). BBC is a strong proponent of public value assessment and also offers games online for inclusion and empowerment (see for example, Citizen X, http://www.bbc.co.uk/schools/citizenx/, on civic engagement). We have found no evidence, however, of research applying public value assessment to the BBC's online game offer.

Exploring the impact of digital games

Various approaches to studying the role of digital games in including and empowering people:

- **Survey research**: Can address the use of more than one game, but requires a longitudinal approach to be able to establish more than correlations
- **Qualitative research**: Reframes the question of impact, but results may also be be difficult to handle by stakeholders who want to see 'hard' facts
- **Experimental research**: Compares game-based approaches with alternative (game-based or non-game based) approaches, or with no participation at all; the outcome ultimately depends on the particular comparison that is made
- **In-game assessment**: Through stealth assessment, researchers can look at game play as evidence of learning and empowerment without disrupting game flow (cfr. evidence centred design). More challenging to deal with unanticipated outcomes.

Although still limited, an increasing number of studies points towards various strategies for effectively using digital games in a number of areas such as health, education, professional training and civic engagement.

Regarding these studies, we need to consider the following:

- Positive bias in published studies: Negative or no effect findings are published less
- Context is key: It is difficult and may even make no sense to look at the impact of games in isolation
- Lack of studies on at-risk populations: Many studies address the impact of games on populations that are not at-risk

When addressing impact on a (funded) project-level, stakeholders are likely to benefit from:

- A clear assessment plan (e.g. Theory of change: theoryofchange.org)
- Sharing best practices (e.g. Working examples: workingexamples.org)

2.7. Knowledge gaps

Overlooking research, theory and practice with regard to games for empowerment and inclusion, we can observe the following knowledge gaps: areas in which there is no or only limited research available, warranting further investigation.

Game adoption, usage and experience by at-risk populations

To be able to successfully approach at-risk populations with game-based approaches, we need to know more about the extent to which they are already involved with digital games, the games they are playing (game genres, platforms, ...) and how they are playing them (where, when, with whom, ...).

Game use for social change in non-formal and informal learning settings

Academic research has mainly focused on the usage of games in the formal learning settings such as the classroom. We need more scientific inquiry into cases where digital games (or borderline cases) have been introduced to non-formal or informal contexts. Such studies should not only look at the role of the game, but at all aspects of the implemented approach such as the role of the intermediary, for instance.

Impact of digital games on social inclusion

Although we see evidence appearing of games resulting in empowerment, few studies have addressed whether and how the use of digital games promoted re-engagement of at-risk groups in every-day life. One challenge lies in the fact that stakeholders are still struggling with how impact assessment should be conducted. This appears to be an issue that is not particular to the domain of social inclusion. Research into using games for educational purposes has also been struggling with the 'transfer' question. Is what is learned during game play actually transferred to everyday-life practices? This has caused some authors to reframe the transfer question and to look into how gaming is situated into a broader set of practices, including learning. For instance, do we see that game use is accompanied by the acquisition of new media skills?

Interpretive research that contextualizes game use

There is only limited interpretive research (e.g. domestication, ethnographic tradition, ...) looking to situate game use in context, in general, and in the context of social inclusion, in particular. This would however be valuable in trying to gain a deeper understanding in the potential of digital games and the characteristics of the context in which it is embedded. For example, are intermediaries supported to integrate games in their approach, how are they guiding participants? Such information and its role should be documented more.

Benefits and risks tied to gamification

The use of game mechanics in non-game activities is only beginning to receive academic attention. It has been argued that we need more research on the benefits and risks tied to the variety of gamification approaches that are out there.

Publication bias for studies with a positive result

Publications with no or negative results tend not to be published. However, we need to think of making such publications available to the research audience so that we gain understanding in factors that contribute to failure of a game-based approach.

Crossing the research-market gap

There is a need for more knowledge on how to proceed from a research-based game to a sustainable product that reaches its target audience.

3. Case studies

In this section, we describe a set of seven well-documented DGEI projects. The full list of criteria used to select these cases and the analytical framework that guided our analysis can be consulted in Section 1.3.2.

Per case, we provide information regarding the game itself, its project background, its target audience, context of use, impact, technology used, and economics of the initiative. We conclude with a critical assessment of the role that the digital games had in promoting empowerment and social inclusion, and the opportunities and challenges faced by the various stakeholders that were involved in the given project.

3.1 Poverty is Not a Game (PING)

GriN Multimedia	
Legal status	Independent company (SME)
Year of creation	2002
Activity	Development of online and browser-based games
Number of employees	Variable (Fixe<5)
Country	Belgium
Website	www.grin.be

Poverty Is Not a Game (PING)	
Date of publication	October 20, 2010
Client	King Baudouin Foundation (Belgium) Institute for Broadband Technology (Belgium) Calouste Gulbenkian Foundation (Portugal/UK) Network of European Foundations Bernheim Foundation (Belgium) Robert Bosch Foundation (Germany)
Project objectives	Raising the awareness of teenagers on poverty and social exclusion issues
Designer(s)/Editor(s)	GriN Multimedia
Website	www.povertyisnotagame.com

3.1.1 Game description

The central aim of PING is to raise awareness about poverty and social exclusion among adolescents. The game takes place in a three-dimensional environment representing an average Western European city. It is an adventure game with two separate scenarios depending on the avatar that is chosen by the player. Both scenarios, however, have the same goal: to raise consciousness about the mechanisms underlying poverty, specifically aiming at what is sometimes referred to as the fourth world.

The first scenario is played with avatar Jim, a boy who decides to leave his home and live independently after a row with his father. He has to find a place to live and a job to pay not only for rent, but also to cover the deposit. In the game he has to make certain decisions, such as the choice of the location of the apartment, which has an influence on rent price

for example. Eventually, Jim loses his job due to illness. The player has to help Jim with resolving his problems he might have during the game, so that Jim will be able to lead a happy life. This scenario covers **situational poverty** (Van Looy, Wouters & De Grove, 2010).

The second scenario is played with avatar Sophia, a girl who comes from a poor family and has to take care of her grandmother. When the latter has to move to a home for the elderly, Sophia finds herself independent. Sophia now has to find a place to live and a job to pay for this. She too will bump into difficult decisions, such as how to combine school and work, work and friends, etc. The player has to help Sophia with her problems and make it possible for her to realize her potential. This scenario covers **generational poverty** (Van Looy, Wouters & De Grove, 2010).

PING is a single-player game that is specifically developed for use in the classroom and is thus playable in the time span of one lesson period (45 minutes). PING offers a basis for a class discussion, because it treats a complex social issue which would perhaps be more difficult when discussed using more traditional teaching method'. PING is also available online for free, so it can also be played outside the classroom context. It can be played in the browser or downloaded (PC only).

Figure 11. Screenshots PING

3.1.2 Project background

Initiative

PING was developed in the context of the European year against combating poverty and social inclusion in 2010. The **King Baudouin Foundation** (BE) and **the Institute for Broadband Technology** (BE) were the initiators of the project. Via the **Network of European Foundations** relevant foundations were contacted to take part in the project. Together with the initiators, the Flemish and the Walloon Government, these foundations - **Calouste Gulbenkian Foundation** (Portugal/UK), **Bernheim Foundation** (BE) and **Robert Bosch Foundation** (DE) - contributed financially to the project and were responsible for the translations of PING and for the launch of the PING game in their own country.

Development

The King Baudouin foundation provided financial support for the development of the game and managed the project together with IBBT, who were responsible for the scientific research before and during the development of the game. For testing and collecting feedback regarding PING, IBBT worked together with **poverty organizations and schools** (both pupils and teachers). Part of the follow-up of the content concerning poverty during

the development was provided through a co-operation between the **European Anti-Poverty Network** and a variety of **organizations active in fighting poverty.** The development of PING took place in 2010 and was approximately a one-year process.

Launch

The King Baudouin Foundation, in co-operation with **European Schoolnet,** provided documentation (How to use PING? Training for teachers) to accompany the game**.** The **Flemish and Walloon Governments** contributed to the launch of PING by providing funding for the conference "Poverty Is Not a Game. Serious Games as a means to discuss complex societal issues." in Brussels. As mentioned above, the foundations involved were responsible for the launch of PING in their respective countries.

3.1.3 Target audience(s)

Initially, 'Poverty Is Not a Game' was aimed at youngsters at the age of 13 and 14. Later, the target group was expanded to **students** up to 16 years old. After feedback by teachers, the target group was again expanded to 18 year olds. They had observed that PING could be useful for these older pupils in vocational educational level.

Figure 12: PING toolkit for teachers

PING targets every segment in this age group: boys and girls, gamers and non-gamers. As mentioned above the game is primarily developed for use in a classroom context. As **principals** and **teachers** are involved to integrate PING in schools and the classroom, a teachers' toolkit was developed to 'introduce teachers to digital games as possible educational resources'; 'provide teachers with a 12-step guide regarding the contextual, technical and pedagogical considerations that need to be taken into account when using digital games in an educational context' and to 'provide teachers with teaching material in terms of activities and content related to the PING game and the subject of poverty, which can be used in a flexible manner, and adapted if necessary by the teacher, to suit the time available and the single subject or multidisciplinary approach' (Kearney, 2010, p. 8).

Poverty is Not A Game is also freely available online, so that it can be played by anyone, also outside the school context. It is available in Dutch, French, English, German and Portuguese and can therefore be played by adolescents in different European countries. PING has been launched in the countries where the foundations that contributed to the project are located: Belgium, Portugal and Germany.

3.1.4 Use context

PING was primarily developed for **classroom use**. When used in class, PING is played individually, but can be situated in a social context. PING could be an introduction to the subject 'Poverty' and during game play a class discussion could be held. After playing the

game, pupils could think about the causes and consequences of poverty in small groups or prepare group presentations, etc. As mentioned above, a teachers' toolkit is provided to help integrate PING in the classroom.

There are different ways to play PING. The PING toolkit is accompanied by a CD-ROM, which contains the game. In this case, the game just needs to be installed on the computer and no Internet access is required. PING can also be downloaded from the website (PC only) and played offline. A third alternative is an online, browser-based version of PING. To play PING online, it is necessary to install the Unity 3D plug-in.

Due to its accessibility on the Internet, PING is available for everyone in contexts outside the classroom. Therefore, PING does not have to be used in class, it can be played at **home** (informal use or as part of homework) or used in **youth associations**.

3.1.5 Technology

Technical Information	
Platform	Browser (PC, Mac)/Download (PC)
Special accessories	None (mouse only)
Technological characteristic	Real-time 3D, GPU accelerated, playable at different resolutions and levels of detail (suitable for less powerful machines)
Language	Unity 3D
Engine	Unity 3D, www.unity3d.com

3.1.6 Impact

Over 5000 **learning packages** including the manual, course material and the CD-ROM were distributed. The website of Poverty Is Not a Game has received 41.424 visitors of which 30.347 are unique, from the 15th of October 2010 until the 13th of January 2012. These numbers are based on results from Google Analytics (Ledford, Texeira & Tyler, 2011) to which the present researchers were given direct access by the project coordinators. As of February 2012, there have been 142.464 page views on the PING **website**. The page where PING can be played online received 24.771 page views, of which 16.755 unique **visitors**. The page where PING can be downloaded has had 5711 page views, of which 4357 unique page views. The page for teachers was viewed 3471 times. The number of visitors that actually played the game online is 19.343, of which 13.823 were unique visitors. Of this number, 74% played in Dutch, 21% in Portuguese, 17% in French, 12% in English and 2% in German.

When we look at the visitors per country, we see that PING has been played in a variety of countries even outside Europe. PING is mostly played in Belgium (27.210 visits), followed by Portugal (5019 visits) and the Netherlands (2650 visits). Besides France (1991 visits) all other countries show fewer than 1000 visits.

PING is a well-documented game: research has been done concerning the game experience of PING, the learning experience, the influence of context on the learning and game experience and the civic potential of PING. These studies will be discussed below.

Game experience and perceived learning

PING was tested during a whole year during its development in 2010. Tests were run in the alpha stage, beta stage and release candidate stage. They took place in 22 classes across 14 schools in the Flemish region, in general and technical educational levels. The age group consisted of third and fourth graders (aged 14-16). At the beginning of the research, pupils were given a brief introduction about the game and about the subject poverty. After this introduction, pupils started playing. During the alpha testing, pupils could play for a period of 25 minutes. During beta and release candidate testing, pupils could play for 50 minutes.

Results showed that PING was received rather well in all three stages. However, female pupils responded more positively to the game than male pupils, this despite the fact that female students in general indicated to feel less competent when playing PING. This could be due to the fact that PING was labelled as an 'educational game' (De Grove et al., 2010).

Figure 2 shows the mean results regarding the **game experience** of PING. **Affective Gaming**, which refers to the attitudes towards being educated via a game, has a high mean score, which indicates that receiving education through a game is experienced positively. This is confirmed by the second highest score for **Positive Affect,** referring to how pupils felt during game play. Generally we can say pupils felt competent playing PING, showing a relatively high score for **Competence** and a lower score for **Challenge**. Learning also has a relatively high score, meaning that pupils felt that they had learned something while playing the game. **Vividness** and **Immersion** scores are moderate. This could be due to the fact that the game was played in a class context and the absence of sounds and music.

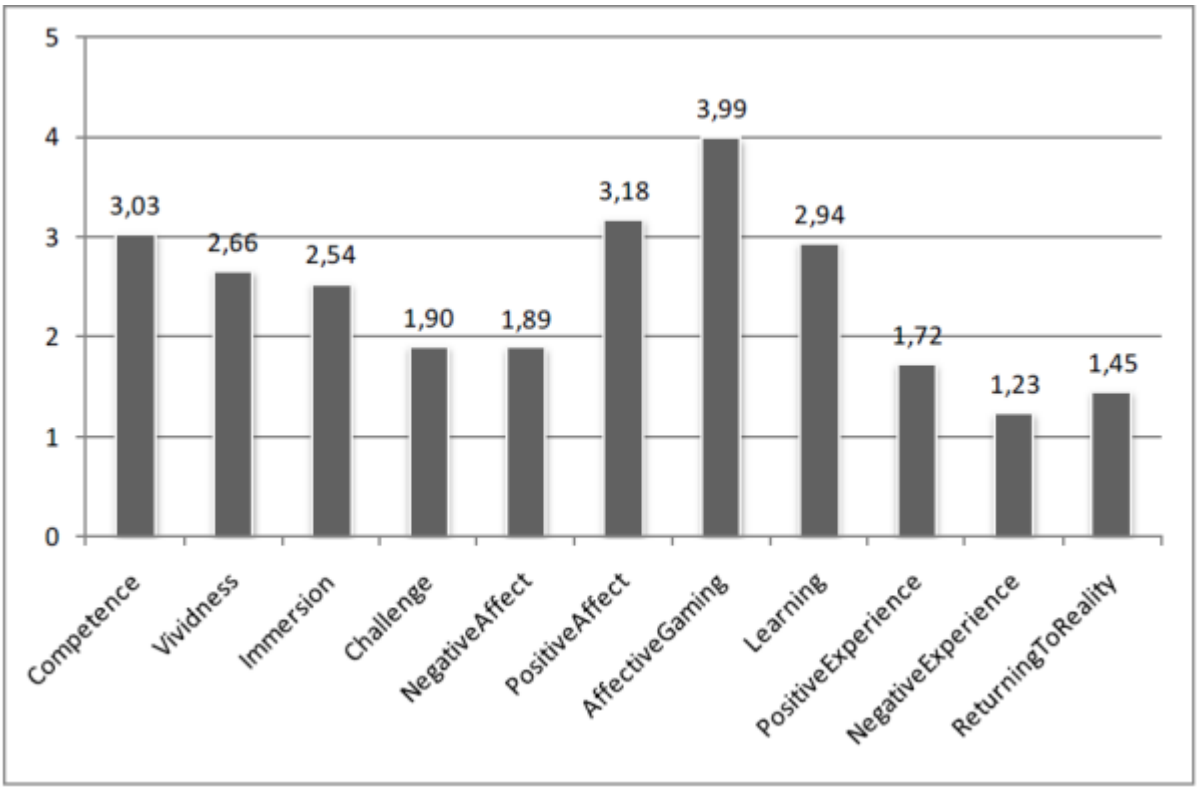

Figure 13. Game experience of PING (mean ratings) (Source: De Grove et al., 2010, p. 18).

Finally, results showed that there is a strong effect of the game experience on **perceived learning**. This means that pupils who enjoyed playing PING had the feeling they had

actually learned something. This shows that an enjoyable and 'fun' game experience results in a higher level of perceived learning (De Grove et al., 2010).

PING in a formal and informal context

Differences in playing and learning experience can be found, depending in the context where PING was played in. In this second study which used a quasi-experimental design and was carried out at the launch of PING, 135 pupils played PING in a **domestic context** and 121 pupils in the **classroom**. Participants were asked to fill in a questionnaire before and after playing PING.

Results show that enjoyment and identification in the **game experience** were higher for pupils playing in a domestic context. Pupils who played in a domestic context also scored higher on perceived learning. These differences for enjoyment and identification appear to be related to the technical performance of the game and time played by the pupils. In a school context, the timeframe for play and the IT infrastructure are limited, which has a negative influence on the game experience. Indeed, when keeping the determinants timeframe and IT infrastructure constant, no difference in feelings of enjoyment and identification are found.

Comparing the two contexts further, it is possible that different factors contribute to enjoyment of the game. In the classroom context, social dynamics could result in positive scores for enjoyment, while in a domestic context more in-game characteristics could result to a positive enjoyment score.

For **perceived learning**, the differences stay the same regardless of time played and technical performance of the game. Playing PING in a domestic context results in higher perceived learning scores. This could be due to the different expectations that pupils have of playing a game dependent on the context in which it is played in. In a class context, pupils may have had higher learning expectations compared to pupils who played PING at home. Different contexts thus call for different approaches and different kinds of educational games (De Grove, 2011).

Political interest, political participation and civic engagement

In this third study, which was carried out together with the previous, participants were asked to play PING and fill out a survey immediately after playing the game. Three months later, participants were asked to fill out the same questionnaire. In total, 275 people participated. The questionnaire contained questions about **political interest, civic engagement and political participation**. Participants' ages ranged from 11 to 66 years. Engagement was measured by using individual and social facilitation measures. This refers to participants acquiring more information about the topic (individual level) or discussing the topic with friends (social level). It is important to note that the questionnaire right after playing the game aimed at exposing **intentions** towards individual and social facilitations, while the questionnaire after three months aimed at exposing actual **behaviour**.

Political interest was high among the participants at the first measurement: 56.4% indicated to be interested and 12.7% indicated to be very interested in politics. Regarding political participation, 6.7% indicated not participating in politics at all. No significant differences were found in political participation over time.

However, significant differences could be found in engagement concerning the topic. These differences were higher for social facilitation than for individual facilitation. After playing

PING, 65.8% of the participants planned to talk to friends about the game or encourage them to play or discuss the topic of poverty. Regarding the individual facilitation, 31.6% of the participants, felt inclined to inform themselves about the topic of poverty. However, no relationships were found between individual and social facilitation and political interest just after playing the game. Results show that after three months, there is a decrease in engagement on the individual facilitation level, with 18.2% of the respondents who actually informed themselves about the topic of poverty. However, an increase can be found in engagement on the social facilitation level, with 71.6% of the respondents who actually talked to friends about the game, encouraged them to play or discussed the topic of poverty (Neys et al, 2012).

***In summary**:* The added value of PING lies in:

(1) Its format and the addition of a toolkit for teachers, which could stimulate use of videogames in the classroom.

(2) The positive reception of PING in the classroom by pupils. Moreover, the positive game experience resulted in a higher level of perceived learning, which means that PING succeeded in integrating the aspect of 'fun' in the game experience. This also shows the importance of creating a fun game experience, even when the main purpose of the game is not entertainment but raising awareness about the topic of poverty.

(3) Its civic potential by fostering social facilitation. An increase in discussion about the topic of poverty has been found among respondents.
(4) The fact that it is a very well documented case: another study conducted using PING for example, has compared playing in a domestic context and playing at school. This resulted in a higher identification with the characters, higher enjoyment during game play and a higher perceived learning in the domestic context. The higher identification and higher enjoyment when playing in a domestic context was however due to a negative influence of a limited timeframe and limited IT infrastructure within the school context.

Important drawbacks of PING were a lack of marketing, resulting in a small amount of teachers being aware of the existence or even the presence of the game at school. PING was spread via the schools, but to stimulate awareness and actual use of the game, PING should have been spread via educational umbrella organizations. Lesson learned here is that the distribution and marketing is an equally important element as developing a good educational game to stimulate actual usage.

3.1.7 Economics of the project

Development	
Total development cost (breakdown if possible)	EUR 200,000 (excluding project management, research, testing, launch and marketing which were carried out by partner organizations)
Industry-related contribution to development costs	
Sponsors (if any) and degree of involvement	1. King Baudouin Foundation: financial support, project management, documentation for teachers 2. Institute for Broadband Technology: financial support, research, project management 3. Calouste Gulbenkian Foundation: financial support, translation and launch 4. Bernheim Foundation: financial support, translation and launch 5. Robert Bosch Foundation: financial support, translation and launch 6. Flemish and Walloon Government: financial support, organizational support launch
Reliance on a specific source of financing and amount received	Sponsorship

Business model	
Pricing strategy	The game is available for free
Revenues and revenue-sharing	n.a.
Sales target	n.a.
Target break-even point	n.a.

Marketing	
Marketing strategy	Towards teachers via general and specialized media, journals and workshops
Project's sales and marketing budget	There was no sales and marketing budget. A press release was issued and information on the game disseminated through different websites on educational games.
Sales force	
Geographical scope	Europe

3.1.8 Source material

Game reference

Poverty Is Not a Game (2010). Grin Multimedia. Antwerp, Belgium. [PC Game and Browser game] Game website: www.povertyisnotagame.com

Literature

De Grove F., Van Looy, J., Courtois, C. & de Marez, L. (2010). 'I Play, therefore I learn?' Measuring the Evolution of Perceived Learning and Game Experiences in the Design Flow of a Serious Game. *Paper presented at the Meaningful Play conference, East-Lansing, MI, USA.*

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3.2 InLiving

Developer	Creative North Studios
Legal status	Independent company
Year of creation	2004
Activity	Development of mobile games and apps for iPhone, Android, mobile phone, Blackberry
Number of employees	11-50
Country	United Kingdom
Website	www.creativenorth.co.uk

Game title	InLiving
Date of publication	2008
Client	Kirklees Neighbourhood Housing
Project objectives	Effectively engaging with, and promoting sustainable tenancies amongst young people
Designer(s)/Editor(s)	Creative North Studios Kirklees Neighbourhood Housing Grassroots Learning
Website	http://www.inliving.co.uk/

3.2.1 Game description

InLiving is a mobile phone based tenancy training game. The central aim is to raise awareness amongst young people about the different risks and challenges that are associated with **independent living**. The main starting point of the game is to give the user a virtual experience as a first-time tenant, but with limited resources and limited skills. As such, the game aims to empower young people to move towards viable tenancies in real life. Concretely, skills such as budgeting, personal care and interpersonal skills are trained.

InLiving is a role-playing game that shows high similarities to 'The Sims' platform. It is build according to **scenario-based learning** principles. At the beginning, the user is invited to create a personalized avatar. Subsequently, the game guides users throughout eight different scenarios related to tenancy management, education and work, affordable credit and loan sharks, financial planning, home contents insurance, unwanted visitors and healthy eating. All available scenarios are based on real-life experiences of tenants of the Kirklees Neighbourhood Housing Association in UK. Important to note is that the different scenarios are updated and improved regularly, based on (1) user feedback; and (2) needs that come to the fore in Housing Offices in the UK. For example, the 'loan shark' scenario and the 'home contents insurance' scenario were integrated in the summer of 2010 as experience showed that few young people were aware about the negative drawbacks of loans by so called loan sharks and the financial importance of home insurance.

Creative North Studies, the developer of the InLiving game, paid particular attention to the aesthetic characteristic of the content and the platform of the game in order to attract and engage youngsters. Additionally, the learning mechanisms and game play characteristics were based on comprehensive and interactive principles. To maximize the game's **attraction for youngsters**, Creative North Studios used a user-centred design approach in which the ideas and experiences of young people were placed at the centre of the design. Consultation rounds with key stakeholders (e.g. Social Housing organizations) were organized in order to ensure the inclusive benefits of the game. As such, InLiving was developed in five consecutive phases:

1. Phase 1 – Consultation with key stakeholders such as the Social Housing Landlord;
2. Phase 2 – Workshop with young people to generate game ideas;
3. Phase 3 – A user-led iterative design process with regular feedback from young people;
4. Phase 4 – End user testing to enable final feedback;
5. Phase 5 – Release and rollout.

Figure 14. Screenshots InLiving.

3.2.2 Project background

The idea for a game on tenancy management targeted at youngsters submerged because of a particular need for intervention with regards to young people, already engaged in or soon to embark on their first time tenancy. The **Kirklees Neighbourhood Housing organization** noticed that most youngsters lacked the basic insights and understandings

of the difficulties and challenges that go hand in hand with tenancy, as for example financial management, mortgage or insurance aspects. Hence, the housing association explored possible way to reach and engage young people, which led to the idea of developing a mobile phone game (Thorpe, 2008). Mobile phone technology was considered as an excellent platform on which to build an innovative learning tool as most young people already owned and used a mobile phone (Innovation Exchange, n.d.). Research indicates that the use of mobile phone applications such as InLiving is a suitable way to encourage youth-at-risk to reengage in mainstream learning (Royle & Colfer, 2010).

In 2007, the mobile phone games developer **Creative North Studios** and the social housing organization Kirklees Neighbourhood Housing established a joint partnership to fund and develop InLiving. Both organizations were involved along the whole development process, from concept to delivery (Innovation Exchange, n.d.). The partnership allowed the InLiving game to be taken a stage further by linking mobile technology to a planned program of online learning (Sharples et al., 2009). The business services company **Grass Roots Learning**, for its part, offered a comprehensive range of products and services aimed at building and deploying InLiving's strong customer-centric strategies, in order to improve engagement with current and prospective tenants. Part of the funding was obtained via the Innovation Exchange and the Next Practice Program, a government program of the Cabinet Office for the Third Sector (Kirklees Business News, 2009). The InLiving game was launched in 2008.

InLiving originally started as a small-scaled local initiative and free access was guaranteed for those living in the Kirklees area (Sharples et al., 2009). From the beginning, the use of the game was integrated into several local schools as a learning tool for Personal, Social and Health Education (PSHE). As of 2009, the InLiving game was also put to the fore as a learning tool in a course named 'A Place of Your Own' which is organized by **Fusion Housing**, an organization that provides housing support, advice and learning opportunities to people living in Kirklees. As a result, the game was included into the educational program of the Young Persons Housing Strategy 2000 – 2012, and as such, became integrated in the Homelessness strategy 2011-2014 developed by the Dartford Borough Council (2011). Gradually, InLiving was also integrated into other initiatives and as such, was launched in various social housing organizations in new areas in the UK (Kirklees Business News, 2009). A distinct added value of the InLiving game lies in the overall integration in formal and informal support organizations. Sharples et al. (2009) state that this extensive collaboration is a prerequisite for the success of tools such as InLiving.

3.2.3 Target audience(s)

InLiving is specifically targeted at **young people aged 16 to 25** who are looking to find a place of their own for the first time or who are experiencing difficulties to maintain their existing tenancies. Even though the game targets youth of divers backgrounds, **special attention goes to young people confronted with exclusion or at-risk of exclusion**. The distribution and deployment of the game is targeted at various social organizations such as social housing institutions or poverty organizations. These highly local socio-cultural organizations function as intermediaries that play a key role for introducing the InLiving-game to the target audience.

3.2.4 Use context

InLiving is being used in informal and formal contexts. The link with formal education and additional informal social structures facilitates access to InLiving for in-home use by youngsters at-risk. Maximum accessibility for at-risk youngsters is guaranteed as participants of a course organized by the housing authorities receive a free personal copy of the InLiving game. The pedagogy of the game is based on the idea of gamification. The different scenarios contain many of the topics that are also covered within formal courses. As such, the game is an excellent way of delivering key information for those who do not participate in formal education. It allows young people to learn by playing in an engaging way. The in-game questionnaire system enables users to test and improve their knowledge as it gives extensive feedback on incorrect answers. Important to note is that the game is not handled as a one-time exercise. Because the game is integrated in the approach of social housing organizations, it allows future tenants to (1) discuss issues arising from the game in face-to-face situations and (2) relate game issues to real-life situations (Sharples et al., 2009).

3.2.5 Technology

Technical Information	
Platform	Compatible with 541 mobile devices, also web-based version available.
Special accessories	None
Technological characteristic	The game is developed using in-house tools and technologies making it easy to update and customize. It can be downloaded in two ways, namely via SMS and via Bluetooth.
Language	Java
Engine	J2ME

3.2.6 Impact

The potential impact of InLiving is expressed in terms of (1) inclusion and empowerment goals – e.g. reengaging young people; (2) learning goals – e.g. hands-on, pre-tenancy training; and (3) financial benefits – e.g. reducing failed tenancy costs and increasing effectiveness of service delivery. However, **few figures are available about the effective impact of the game** with regards to these different pre-set goals. For example, learning impact is mainly assessed through the use of an in-game questionnaire system: "As game players encounter different scenarios within the game they will have the opportunity and incentive to give feedback on such both in terms of what they learned from playing the game and the extent to which they enjoyed the game playing experience. This feedback is gathered on databases for our clients, providing them with valuable measurable data".[6] As such, associations using InLiving are provided with impact figures on learning outcomes. However, none of these measurable outcomes are mentioned or available online.

Nevertheless, InLiving can be considered as a successful initiative. The initial testing groups reacted highly positive with regards to the learning acquisition and the development

[6] www.inliving.co.uk/

process of the game (Thorpe, 2008). Nearly six months after the game's release, 600-700 games had been **downloaded** in addition to those delivered through Bluetooth technology via schools, care teams, housing associations and other agencies. The overall positive attitude towards the game is confirmed by research that indicates that the majority of the young people in the target group showed a high **motivation** to play the game and in addition, were willing to explore different options and scenarios within the game. With regards to the pre-set empowerment and inclusion goals, initial figures indicate that successful **tenancies** have increased by 10% after the integration of the game into the support package of Kirklees Neighbourhood Housing. It is also stated that the InLiving game has proven to be effective as a tool to trigger the enthusiasm and general **engagement** of young people (Sharples et al., 2009). The game also appears to be highly suitable to reengaging young people that are Not in Employment, Education or Training (NEET) (Royle & Colfer, 2010). However, no additional figures or qualitative research resources are available to support the empowering impact.

***In summary**:* The main reasons for the success of the InLiving game are (1) the extensively user-driven approach used in the game design; and (2) the elaborated support structures for the use of the InLiving game for inclusion and empowerment goals. The participatory approach used for the initial and future design of the game, acknowledges the added value of the users' experiences and challenges and as such, contributes to their empowerment. The use and recognition of the InLiving game by locally based formal and informal structures increases the chances of reaching, teaching and hence, empowering those youngsters who are most at-risk.

3.2.7 Economics of the project

Development	
Total development cost (breakdown if possible)	£40,000
Industry-related contribution to development costs	50% by Creative North Studios
Sponsors (if any) and degree of Involvement	Not applicable
Reliance on a specific source of financing and amount received	Funding by Kirklees Neighbourhood Housing. Funding by Innovation Exchange and the Next Practice Program of Third Sector in the Cabinet Office.

Business model	**Joint venture**
Pricing strategy	Free of charge for end users. Licensing principle, pricing for intermediary organizations on demand.
Revenues and revenue-sharing	Unknown
Sales target	Unknown
Target break-even point	Unknown

Marketing	
Marketing strategy	n.a.
Project's sales and marketing Budget	n.a.
Sales force	n.a.
Geographical scope	United Kingdom

3.2.8 Source material

Game reference

InLiving (2008). *Grassroots Learning.* [Browser game]. Game website: http://www.grassroots.uk.com/web/guest/home. http://www.inliving.co.uk/

Consulted Websites

- http://www.inliving.co.uk/
- http://www.grassroots.co.uk/
- http://www.fusionhousing.org.uk/

Literature

Dartford Borough Council. (2011). *Homelessness Strategy 2011-2014. To proactively prevent homelessness through strong partnership working and provide an inclusive and accessible service to all.* Dartford, Kent: UK Dartford Borough Council, Civic Centre, Home Gardens.

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Thorpe, C. (2008). *Role play route to getting a roof over your head*. Inside Housing.co.uk. Retrieved from http://www.insidehousing.co.uk/role-play-route-to-getting-a-roof-over-your-head/6500070.article

3.3 At-Risk

Developer	Kognito Interactive
Legal status	Independent company
Year of creation	2003
Activity	Development of online role-playing simulations and games
Number of employees	11-50 employees
Country	US
Website	http://www.kognito.com

Game title	At-Risk for University Faculty
Date of publication	2009
Client	Aimed at universities in US.
Project objectives	Creation of an online interactive gatekeeper training program to enable university staff members to identify and refer students in psychological and mental distress
Designer(s)/Editor(s)	Kognito Interactive Mental Health Association of New York City
Website	http://www.kognito.com/products/faculty

3.3.1 Game description

At-Risk for University Faculty is an online interactive gatekeeper-training program, targeted at university faculty staff members. The central aim is to help faculty members identify and refer students that are experiencing psychological and mental distress. As such, the game indirectly focuses on decreasing the number of suicides amongst university students. Besides the At-Risk game for University Faculty, two similar versions of the game exist. A first version is called At-Risk for University Students and is targeted towards university students themselves. It focuses on peer-to-peer training and aims to prepare students to identify and refer fellow students that are in psychological and mental distress. A second version is called At-Risk for High School Educators and specifically focuses on gatekeeper training of high school staff and teachers.

All three At-Risk games are virtual **online role-playing games** that simulate conversations with students that might experience mental distress such as bipolar disorder, borderline personality disorder, depression or eating disorder. They are **avatar-based** learning games situated in a virtual classroom or office in which the user assumes the role of a faculty member, fellow student or high school teacher. The game itself consists of a 45-minute online training that enables users to examine the common indicators of psychological distress and to discover suited methods for approaching an at-risk student for referral to the counselling centre (Kognito Interactive, 2009a).

All three games are based on **four distinctive steps**: (1) develop the ability to identify students at-risk of mental distress amongst a group of students; (2) acquire knowledge on how to approach and refer at-risk students by conducting virtual conversations; (3) evaluate the personal learning outcomes via in-game feedback mechanisms; and (4) get recognition through a reward system after completion of the course by way of a certificate (Shaughnessy, 2009). Based on these four distinctive steps, or levels, the game tries to enhance a comprehensive learning process that allows users to identify warning signs, develop awareness on situations of mental distress and develop an understanding of their school specific referral and counselling services (Kognito Interactive, 2009a).

The main **focus** of the At-Risk project lies on the **online role-playing simulations and scenarios**, rather than on the gaming aspect. There is no mention of an elaborate set of rules. The impression of play is mostly created by the aesthetic characteristics of the simulation. The demo shows great care for detail and reproduction of real life situations. Also, the game is made interactive and realistic by the use of avatars with a certain degree of emotional intelligence and memory (Shaugnessy, 2009).

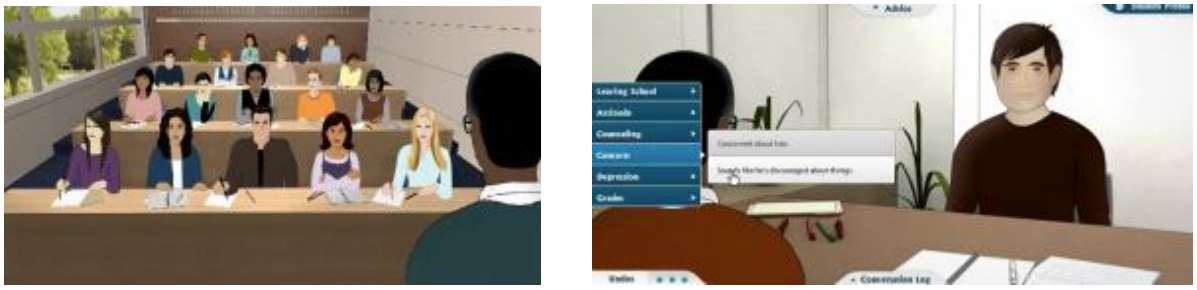

Figure 15. Screenshots At-Risk.

3.3.2 Project background

Kognito Interactive developed the At-Risk game in 2008 in partnership with the **Mental Health Association of New York City**. It was launched in 2009 (Shaugnessy, 2009). To ensure positive learning outcomes, university counsellors, mental health experts and students were consulted during the design and development process of the game (American Foundation for Suicide Prevention, 2009). Though no mention is made about the initial reasons for developing the game, Kognito Interactive (2009a) extensively refers to the problems of mental distress amongst college students. According to recent studies, about 30% of all college students have difficulties to function normally due to feelings of depression. Also, approximately 6% of college students have seriously considered suicide and of those who actually commit suicide, over 1350 college students each year, the vast majority goes unnoticed (Kognito Interactive, 2009a).

Kognito Interactive (2011a) puts gatekeeper training to the fore as a critical component of suicide prevention strategies. They state that faculty members are preferred counsellors in a situation like this because of their privileged, standardized and long-term based contact with students (Shaughnessy, 2009). According to Kognito Interactive, faculty staff members are ideally placed to detect the first signs of mental distress amongst students, namely by looking at disruptive behaviour, poor academic performance, unexplained absence and incomplete assignments (Kognito Interactive, 2009c). Additionally, the use of the At-Risk game is based on the idea that referring students to a counsel centre has a positive impact on students' retention and academic performance. As such, the At-Risk game is believed to

have a positive impact on the general wellbeing of students, their likelihood of graduation and their overall academic performances (Kognito Interactive, 2009b).

Since the beginning, At-Risk has been integrated in different suicide prevention programs by a vast number of formal institutions such as the **Texas Department of Health Services**, the New York State Office of Mental Health, the **New York City Ohio Suicide Prevention Foundation** and the **Suicide Prevention Resource Center** (Kognito Interactive, 2009a). Very recent, the At-Risk game targeted at high school educators, has received the support of the federal **Substance Abuse and Mental Health Service Administration (SAMSHA)** and will be deployed to reach 20.000 high school educators by the end of 2014. This campaign, also called 'the campaign for hope' was granted with $1.4 million by SAMSHA (PR Newswire, 2011). The American Foundation for Suicide Prevention (2009) emphasizes that the use of At-Risk is most effective when integrated in a larger strategic university plan to identify and support at-risk students.

3.3.3 Target audience(s)

The At-Risk game is directly targeted at **Universities, Colleges and High Schools** in the US and as such, indirectly benefits college and high school students. The At-Risk for University Students is aimed at university students themselves. Kognito Interactive focuses on English-speaking regions such as the US, Canada, Australia and UK. Currently, approximately 350.000 health providers, managers, paramilitary personnel, teachers, students and families of returning veterans are being reached with the various products of Kognito Interactive.

3.3.4 Use context

The At-Risk games are mainly used in a **formal learning context**, namely in high schools, colleges and universities. They are presented as a learning game and their use is highly associated with cognitive and formal knowledge acquisition. To ensure their relevance at a local level, Kognito Interactive uses a customized approach. This means that the At-Risk games contain several **customizable** features that can easily be adapted to the unique resources and referral systems of a specific school or campus (American Foundation for Suicide Prevention, 2009). The At-Risk games are accessible via the Internet 24/7 and continuously keep track of the progress of individual users (Kognito, 2009a). Kognito Interactive also offers a customized "My Counseling Center" page and on-campus promotion materials such as pre-formulated emails to learners, customized flyers, power point presentations and a suggestion list of marketing strategies (Redden, 2009). It is also possible to organize a seminar on how to implement the game (Kognito Interactive, 2009a).

3.3.5 Technology

Technical Information	
Platform	Web-based, Human Interaction Simulation Platform by Kognito Interactive
Special accessories	Internet connection
Technological characteristic	Not specified
Language	Not specified
Engine	Human Interaction Game Engine by Kognito Interactive

3.3.6 Impact

Since the launch in 2008, more than 100 universities in the US, Canada, UK and Australia have adopted the At-Risk game. The potential benefits of the game are expressed in terms of (1) **cost-effectiveness**; and (2) **learning** acquisition amongst faculty staff to handle students in mental distress (Kognito Interactive, 2009a). The game by default has a built-in measurement tool that tracks users' progress in the game (e.g. decisions taken, time spent, completion rates) and that collects user feedback. In addition, longitudinal data on behavioural change and knowledge acquisition is collected by way of pre-, post and follow-up surveys. Different empirical studies were commissioned by Kognito Interactive to evaluate the impact of the At-Risk games. All reveal measureable and positive changes in users' skills and behaviours. These impact data have, however, been criticized because of the unreliable sample size of the impact studies (Heeter, 2009).

The evaluation study on the At-Risk game for University Faculty shows that the use of the game increases the likelihood that faculty staff will approach, and refer at-risk students. With regards to the users' experience of the game, the results indicate that 99% of the users rate the game from good to excellent. Also, over 70% of the users report that the simulated conversations were highly realistic and in line with real-life situations. About 80% of the users agree that they felt more confident to approach at-risk students. After implementation of the At-Risk game, referral of students showing signs of mental distress, increased on average by 109% (Kognito Interactive, 2011a).

Similar research results are shown for the At-Risk game for High Schools Educators based on empirical study conducted in 2010 among 327 high school teachers in 40 states in the US. Over 97% of the users indicate that they were likely or very likely to approach a student showing signs of mental distress (Kognito Interactive, 2011b). Overall, one can consider that these types of gatekeeper trainings are effective in the sense that the first signs of mental distress are more easily recognized and that the confidence to approach and refer students increases significantly amongst staff members who completed the game (Kognito Interactive, 2009c).

An article by Redden (2009) nuances the impact and points out that the **adoption rate** of the At-Risk games is going slower than expected. Redden (2009) points out that most train-the-trainer opportunities in counselling centres are realized through a bottom-up approach, meaning by way of a demand and learner driven approach. Hence, merely providing access to an online prevention program as such is insufficient to ensure uptake and actual impact. Isaac et al. (2009) question the impact of gatekeeper training as a preventive intervention for suicide. On the one hand, gatekeeper training can be considered as successful to transmit knowledge, build skills and influence attitudes of trainees. On the other hand, further research needs to be done on the **sustainability** of the knowledge acquisition and behavioral changes, as well as the referral patterns of gatekeepers. The current methodologies used to assess effect are questionable. Isaac et al. (2009) advocate randomized controlled trials.

***In summary**:* The main added value of the At-Risk games lies in (1) their alignment with local needs and referral systems, and (2) their built-in progress and assessment mechanisms. The customized approach allows for a game that is in line with school-specific consulting and referring systems and as such, increases the engagement of users. The built-in progress and assessment tools allow for a personalized approach and a decrease in the learning curve thanks to elaborate and customized feedback. Important drawbacks of the At-Risk games are (1) their top-down approach, (2) their limited time frame, and hence (3) the sustainable character of their impact. By focusing deployment on universities, a push approach is used that highly focuses on delivering access to the game. However, ensuring access is not a guarantee for usage. Because of the limited time frame – 45 minutes – of the game, long-term and sustainable behavioral changes are unlikely to be reached.

3.3.7 Economics of the project

Development	
Total development cost (breakdown if possible)	Unknown
Industry-related contribution to development costs	Unknown
Sponsors (if any) and degree of involvement	Unknown
Reliance on a specific source of financing and amount received	Unknown

Business model	
Pricing strategy	Yearly, institution-wide license. Annual license pricing begins at $3.250. Special pricing is available for small schools. The listed prices for At-Risk vary by number of users: $24.95 per person to train 50 to 500 personnel. $9.95 per person to train 501 to 2,500 personnel. over $2.500 price is on demand.
Revenues and revenue-sharing	Unknown
Sales target	Colleges and universities
Target break-even point	Unknown

Marketing	
Marketing strategy	At-Risk includes a number of components and other tools that can assist in marketing the product to stakeholders and learners: (1) Built-in assessment (2) Materials for on-campus promotion Suggested language for an email to learners Customizable flyer PowerPoint presentation with guidelines An animated and narrated trailer about the program A list of suggested marketing strategies (3) Integration of campus-specific information Customized "My Counselling Centre" web page
Project's sales and marketing Budget	Unknown
Sales force	Unknown
Geographical scope	US campuses nationwide

3.3.8 Source material

Game reference

At-risk (2008). *Kognito Interactive*. [Browser game]. Game website: http://www.kognito.com.

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- http://www.kognito.com

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Redden, E. (2009). *On mental health, an online tool.* Inside Higher Ed. Retrieved from: http://www.insidehighered.com/news/2009/03/17/mentalhealth

Shaughnessy, M.F. (2009). *An interview with Glenn Albright: Preventing College suicide.* Retrieved from: http://www.kognito.com/articles/EducationNews_AtRisk_Interview_w_Glenn.pdf

3.4 Choices and Voices

Developer	**PlayGen**
Legal status	Independent company
Year of creation	2001
Activity	Development of serious games and gamification apps and simulations.
Number of employees	11-50 employees
Country	UK
Website	http://Playgen.com
Game title	**Choices and Voices**
Date of publication	2008
Client	Police Services Education Authorities
Project objectives	Motivate young people to explore and discuss the underlying issues that might lead to tense situations and extreme violence.
Designer(s)/Editor(s)	PlayGen West Midlands Police Department Avon & Somerset Constabulary University of Birmingham Department for Children, Schools and Families
Website	http://www.choicesandvoices.com/

3.4.1 Game description

Choices and Voices is an **online interactive simulation game** developed to prevent violent extremism and enhance community cohesion among children. It aims to engage more effectively with young people from various social backgrounds in order to counter or reflect on issues like social exclusion, bullying or violent behaviour. Three concrete goals are put forward, namely (1) to promote a more in-depth understanding on various belief systems and on issues of social and economic inequality; (2) to encourage collaboration between young people and improve their social skills; and (3) to make young people aware of the similarities and differences they encounter.

During the expert interview conducted with regard to this case, it was emphasized that **customization** of a game in terms of adapting game elements to the local context by using local accents, geographic points of reference or other characteristics, increases engagement. Choices and Voices comprises a series of **three games** adapted to a specific region in the UK and a specific age range: Choices and Voices for West Midlands, Choices and Voices for Southwest and Choices and Voices for Primary. The game is primarily used as a starting point for classroom delivered lessons. Based on two short interactive role-play based scenarios, children explore different viewpoints followed by structured class discussions.

All Choices and Voices games are based on the same principles. The user can choose between **two scenarios** taking place in a virtual multicultural community. In a first scenario, the user is confronted to a new, relatively unknown group of people that shows a negative attitude towards the user's immediate environment. In a second scenario, the user takes on the role of the group leader and as such carries responsibility over the group's actions. Each scenario is divided into a series of actions and scenes (Memarzia & Star, 2011). The user decides upon actions to be taken and is faced with a number of moral dilemmas. Throughout the game, four key messages and themes are addressed, namely (1) peer pressure; (2) social exclusion and isolation; (3) bullying, humiliation and exposure to violence; and (4) feelings of underachievement and lack of respect.

PlayGen, the developer of the game, attached great importance to the aesthetic design of the game by creating highly realistic characters. However, during game play, the characters appear rather static, which has a negative influence on the **game experience**. Also, the unsynchronized sound of the dialogues and the frequently appearing error messages disturb the play rhythm. This is mainly due to the technological set-up of the game. To make sure that the game could easily be used in every classroom and on any computer, the game design was developed according to low technical standards. Currently the game is not developed any further, meaning that no new scenarios or additional game features are added. An important question is then to what extent Choices and Voices remains up-to-date and in line with the various difficulties encountered in local communities.

Figure 16. Screenshots Choices and Voices.

3.4.2 Project background

The Choices and Voices game was developed as a means to prevent violent and extreme behaviour amongst young people. It is based on the assumption that prevention, through open and honest conversations on attitudes, ideas and choices in a safe and positive environment, is the most effective way to stop young people from turning to violence.

PlayGen developed the game over a six-month period involving different stakeholders such as the **West Midlands Counter Terrorism Unit** of West Midland police, the **Birmingham University's School of Education**, the **Department of Children Schools and Families (DCSF)** and a number of **regional schools** (PlayGen, 2010). These extensive partnerships were set-up to ensure that the game was developed in line with the educational national curricula and the DCSF's national strategy.

According to the expert interview with Memarzia, the success of Choices and Voices highly depended on the involvement of various experts, civil society or other intermediary organizations and members of the target group in the overall project and the game design. However, when doing this, it appeared to be crucial to **manage the expectations of each of the stakeholders** involved by being extremely transparent and clear about the project's goals, feasibility and potential outcome.

PlayGen used six distinctive phases in the design and deployment process of Choices and Voices, namely (1) explore and discover; (2) plan and design; (3) invent and prototype; (4) build and refine; (5) deploy and support; and finally (6) manage and grow (PlayGen, 2010). Young people (e.g. target group) and home offices, local authorities and the UK Local Government Association (LGA) (e.g. civil society) were involved during the first phase in order to determine the different crucial needs at a local level. A consortium of experts was consulted in phases 1, 2 and 3 to ensure the integration of the proper learning trajectories in the game design.

The home offices, **local authorities** and the **Local Government Association** also played a crucial role as they financed the pilot of the game in 2007 via the 'preventing violent extremism' program (PVE). After the pilot, home offices and local authorities continued to support the development and deployment of the game (Memarzia & Star, 2011). Because of its integration in national curricula, no marketing strategy was necessary to ensure game distribution and uptake. The game was mainly pushed through top-down. Currently, it is spread by word-of-mouth. The game is made available for free for those who register online.

3.4.3 Target audience(s)

Choices & Voices targets **secondary schools** located in the UK and hence, indirectly aims to reach schoolchildren between 12 and 18 year old. Schools are put to the fore as central bridging points between children and society; and as central points through which local communities can be reached (ACPO, 2010). To stimulate the integration of the game, Choices and Voices is free of charge for secondary schools in different regions in the UK.

PlayGen aims to reach over 600 schools within Birmingham and the South West of the UK. However, it has a relatively small geographic scope because of the fact that the game needs to respond to local issues regarding violent extremism amongst young people. Localized versions of the game are therefore developed on demand (Memarzia & Star, 2011).

3.4.4 Use context

The Choices and Voices game is meant for use in an educational context by teachers in secondary school environments to enhance class discussions on issues related to violent behavior. Nonetheless, other authorities such as policy officers might also benefit from the game to instigate and facilitate discussions. Each game is accompanied by a **teachers' guide** that contains the following elements: context and background of the game, concrete learning objectives, valuable curriculum links, information on the character profiles, different lesson outlines and possible questions for discussions (PlayGen, 2011). The game is accompanied by the **DCSF toolkit for teachers, which is called** 'Learning together to be safe' (ACPO, 2010). In addition, a booklet was designed for schools containing **practical advice** on how schools and other partners in the local community can contribute to the prevention of violent extremism (DCSF, 2008).

Overall Choices and Voices aims to enhance learning acquisition by way of simulating real-life situations, in which players are compelled to make decisions, observe consequences and change their course of actions in order to succeed (PlayGen, 2010). Furthermore, the game tries to find a balance between formal and informal learning, always keeping in mind the 'serious' dimension. It combines effective gaming mechanisms with proven cognitive techniques in order to create interactivity that goes beyond pure entertainment.

3.4.5 Technology

Technical Information	
Platform	Web-based and offline
Special accessories	One computer per one or two pupils. Internet connection for web-based version.
Technological characteristic	Any computer
Language	Unknown
Engine	Unknown

3.4.6 Impact

So far more than 600 schools within Birmingham and the South West of the UK have adopted Choices and Voices, which means that over 60.000 users are currently reached. Overall, the **few available testimonies and figures** suggest a rather positive reaction to the game. According to research conducted for the *Prevent* report, students seem to

appreciate the new approach of Choices and Voices to learn about how to prevent violent behavior (Association of Chief Police Officers, 2010). However, results don't specify if, and to what extent, Choices and Voices is integrated in class curricula and whether these simulation-based lessons lead to a long-term behavioural change. Such conclusions could not be made given, mainly because a built-in assessment tool was not foreseen and additional longitudinal impact assessment studies have not been invested in.

Only Memarzia and Star (2011) and Davies (2011) have conducted studies in which the **experience and perceived usefulness** of Choices and Voices was evaluated. The results show that young people enjoyed playing the game and wanted to repeat playing the game in order to see the consequences of different decisions. More than violent behaviour and excessive religion related violence, young people put peer pressure to the fore as the central issue of the game. Also, the study indicates that the use and contextualization by teachers had a significant influence on the success of the game. Teachers, who read, consulted and applied the tips and tricks in the teachers guide, were more able to link the game to real-life situations, and as such, succeeded more easily in engaging with the students.

Memarzia & Star (2011) emphasize the fact that in order to achieve long-term changes, using the game only once will not be sufficient. The expert interviews confirm this and emphasize that nothing works in isolation. Using a game like Choices and Voices to realize behavioural change is only possible when it is integrated in additional experiences and strategic programs or initiatives.

***In summary**:* The main added value of the game lies in (1) the extensive multi-stakeholder involvement in the overall project and the game design; (2) the role of the intermediary organization that guided and contextualized use; (3) the game-related experience; and (4) the overall integration in strategic programs and educational curricula. Young people are motivated to play and replay the game in order to discover the consequences of differing decisions. The overall integration in educational curricula implies a large deployment and use of the game. The most important drawback of the game is the lack of data and hence, the lack of insights about the actual learning curve and behavioural change amongst users.

3.4.7 Economics of the project

Development	
Total development cost (breakdown if possible)	Unknown
Industry-related contribution to development costs	Unknown
Sponsors (if any) and degree of Involvement	Unknown
Reliance on a specific source of financing and amount received	Unknown

Business model	
Pricing strategy	None. Available free of charge in different regions in UK.
Revenues and revenue-sharing	n.a.
Sales target	n.a.
Target break-even point	n.a.

Marketing	
Marketing strategy	n.a.
Project's sales and marketing Budget	n.a.
Sales force	n.a.
Geographical scope	Local communities within UK

3.4.8 Source material

Game reference

Choices and Voices (2009). *PlayGen*. [Browser game]. Game website: http://playgen.com

Consulted Websites

- http://playgen.com
- http://memarzia.org
- http://www.choicesandvoices.com

Literature

Association of Chief Police Officers (ACPO). (2010). *Prevent. Annual Report 09/10*. Retrieved from http://www.acpo.police.uk/documents/TAM/20110211%20Prevent%20ACPO%20Annual%20Report.pdf

Davies, L. (2011). *Choices and Voices: An evaluation of the interactive resource for schools for preventing violent extremism.*

Playgen (2010). *We make playful solutions to engage, influence, measure, inspire.* Retrieved from: http://playgen.com/downloads/playgen_brochure_2010/brochure_A_2010_web.pdf

Playgen (2011). *Teachers' Guide. Version 3.5*. Retrieved from: http://www.avonandsomerset.police.uk/information/documents/cache/HTML/Document4604_406249.html

Memarzia, M. & Star, K. (2011). Choices and Voices: A Serious Game for Preventing Violent Extremism. In Akhgar, B. & Yates, S. (Eds.) *Intelligence Management Knowledge Driven Frameworks for Combating Terrorism and Organized Crime*. London: Springer.

Department for children, schools and families (DCSF). (2008). *Learning together to be safe: A toolkit to help schools contribute to the prevention of violent extremism*. Retrieved from: http://dera.ioe.ac.uk/8396/1/DCSF-Learning%20Together_bkmk.pdf

Expert interview

- **Who?** Mitra Memarzia. Freelance artist and educator. Associated lecturer at Sheffield Hallam University. Specialist lecturer at Birmingham City University and Coventry University.
- **Role in case?** Specialist researcher for Playgen Ltd., Serious games Company that developed the Choices & Voices game. Involved in the initial development process of the game.
- Contacted when? March 8, 2012.

3.5 Starbright World

Developer	Starlight Children's Foundation
Legal status	Non-profit organization
Year of creation	1983
Activity	Improve quality of life for children with chronic and life-threatening medical condition through entertainment, education and family activities.
Number of employees	Unknown
Country	US and Canada, additional affiliations in Australia, Japan and UK
Website	http://www.starlight.org/

Game title	Starbright World
Date of publication	Initially launched in 1996, renewed web-based version launched in 2006.
Client	Starlight Children's Foundation
Project objectives	Creation of a social network for children with serious medical conditions and their siblings, aged 13 to 20 enabling these children to express themselves and exchange with others about their illness, fears and feelings.
Designer(s)/Editor(s)	1996 version • Worlds, Inc. • Starlight Children's Foundation 2006 version • Schematic • Userplane • Starlight Children's Foundation
Website	http://www.starbrightworld.org

3.5.1 Game description

Starbright World was **initially conceived as a 3-D virtual world** for seriously ill children that were staying in hospitals. The version launched in 1996 consisted of different sub-worlds (e.g. tropical world, sky world, cave world and the building zone) in which children could meet via a local network to play and discuss. However, in 1996, the 3-D technology appeared too unstable and the Starlight Children's Foundation wanted to move towards a more evolved community. Consequently, a second and more elaborated version of Starbright World was launched in 2006. This version consists of an online portal, conceptualized as virtual hangout exclusively for teens with serious medical conditions and their siblings, aged 13 to 20. This trilingual (English, French and Spanish) **online social network** enables users to connect, share information, and mentally support each other. In 2009, thanks to a grant from Vivendi, social networking technologies were added to the platform (Starlight Children's Foundation, n.d.). As such, Starbright World now contains several applications such as moderated chat rooms, games, bulletin boards, videos, e-cards

and personal profiles. The main aim of the platform is to provide support and to distract seriously ill youngsters from their daily struggles.

Users can choose amongst five pages: (1) Connect; (2) My life; (3) The latest; (4) Games: and (5) Videos. Each of these sections was created with a specific goal. The 'Connect' section enables users to interact with others by way of moderated chat rooms, polls, e-cards and more. The 'My life' page aims to support users in their reflections on their feelings and the possibility of death. The 'The latest' page is merely intended to inform users about new members, recent actions by users and the newest features in order to keep all users engaged as active members of the community. As mentioned, members of Starbright World can also choose to play games. In order to stimulate interactivity between users, the platform provides access to a high number of multiple player games such as Battleship or Connect Four in the 'Games' section. In addition, the 'Videos' page allows users to share all kinds of multimedia projects they want to showcase. Staff of the Starlight Children's Foundation professionally moderates the site.

Figure 17. Screenshots Starbright World (version 1996).

Figure 18. Screenshots Starbright World (version 2006).

3.5.2 Project background

Starbright World is one of the programs funded by the **Starlight Children's Foundation**. This is a non-profit organization founded in 1983 by Dynasty actress, Emma Samms, and film producer Peter Samuelson. The foundation has funded and developed numerous programs to support seriously ill teenagers and their families. The link with Hollywood also comes to the fore in Starbright World. For example, the 1996 version was developed with the support of Steven Spielberg. Today this support continues and actresses like Jamie Lee Curtis profile themselves as global ambassadors of Starlight and Starbright World. The **Hollywood-connection** additionally shows in the funding schemes of Starbright World and

the other programs of the Starlight Children's Foundation. The Foundation receives financial **support from a large number of major industries** such as Nintendo or Nestlé. For example, in 2010 the California Pizza Kitchen foundation donated $ 1 million to Starlight. Vivendi in particular granted the Starbright World program with $100.000. AOL granted over five times that amount for the Starbright World program. In addition, the Starlight Children's Foundation collects significant resources by way of all kinds of **high-level funding events**.

The main reason for creating Starbright World was to improve the lives of young people with chronic or life-threatening illnesses. It was based on the realization that many youngsters living with a serious illness, experience physical and emotional isolation. They constantly move in and out of hospital and have difficulties to engage in long-term relations with other teens in their immediate social environment. As such, they could benefit tremendously from an online world that enables them to connect and share experiences with others. This idea grew out of the experiences of Emma Samms, co-founder of the Starlight Children's Foundation, who lost her little brother at the age of 9 due to a severe illness.

3.5.3 Target audience(s)

Starbright World is targeted at **young people** between 13 and 20 years old who have a **serious medical condition**, such as a chronic or terminal illness, that requires frequent hospitalizations or long-term treatments. It also allows their **siblings** to join, if aged 13 to 20. Even though exceptions can be made, teens with developmental, emotional and/or behavioural conditions are discouraged to play. Becoming a member of Starbright World is highly restricted and by default requires permission by parents. Starbright World has a **worldwide reach** and is available in the US, Canada, Australia, Japan and UK. In the meanwhile, the platform has been made accessible in English, Spanish and French.

3.5.4 Use context

Initially, Starbright World (e.g. version 1996) was only accessible from a proprietary hospital network and hence, had a limited usage scope. It was mainly based on the concept of a playground, allowing children to explore different places in a virtual world and enable them to create their own environments. With the second version, brought online in 2006, the game became accessible **anyplace and anytime**, at home or in a hospital, and was expanded to a multimedia community allowing young people to communicate, interact and share ideas and experiences.

Starbright World entirely fits within the different activities and programs established by the Starlight Children's Foundation. Throughout their entire approach, the Foundation prioritizes fun and play combined with serious information or edutainment. The Foundation collaborates with nearly 1400 hospitals in the US. Apart from access to Starbright World, the Foundation also provides several in-hospital programs such as Fun Centers (e.g. mobile entertainment units for in-room use in hospitals) or Starlight Sites (e.g. relaxing, interactive, play-oriented environments within hospitals). The Starbright World program goes **beyond the in-hospital approach** and aims to engage the immediate family of seriously ill children.

3.5.5 Technology

Technical Information	
Platform	Multimedia web-based community
Special accessories	Internet connection
Technological characteristics	Unknown
Language	Flash-based communication technology by Userplane
Engine	Unknown

3.5.6 Impact

Starbright World is well integrated in the Starlight Children's Foundation hospital network and as such, reaches over 180.000 children and families in the US. More recent figures on deployment and usage of Starbright World itself are not made publicly available. The Starlight Children's Foundation commissioned several studies on the actual impact of the Starbright World program. Most of these studies were realized by way of **qualitative research** methods and the results demonstrate the added value of Starbright World in terms of **reduction in pain, anxiety, loneliness and withdrawn behaviour** (Starlight Children's Foundation, n.d.). Studies on the 1996 in-hospital version of Starbright World, suggest a diminishing of feeling of being lonely. Users experience a feeling of connectedness and community belonging with peers with similar backgrounds and/or illnesses (Battles & Wiener, 2002; Bush & Simonian, 2002; Hazzard et al., 2002; Holden et al., 1999). Also the perception of social support from friends seems to increase (Hazzard et al, 2002). Similar conclusions are put to the fore with regards to the 2006 online version. Recent studies demonstrate additional benefits such as **improved self-efficacy and self-esteem**, reduced pain, **increased communication, socialization and peer support**, and an **improved ability amongst young people to cope with their illness** (Cashin & Witt, 2010). As such, the different studies clearly indicate the potential long-term contribution of the Starbright World program for the social inclusion and empowerment of hospitalized children.

However, results on impact need to be approached critically. Hazzard et al. (2002) emphasize that obtaining **clear-cut effectiveness results is complicated** because the effects can vary according to the disease or age group and the dependent measure. Bush et al. (2002) add that the combination of multiple methods of intervention – i.e. communication, social support, self-expression, education-information and distraction – and multiple desired outcomes, like feelings of empowerment, are difficult to be taken into account as a whole. Eysenbach et al. (2004) state that no hard evidence can be found to demonstrate the causal relation between the use of online communities and social outcomes. They emphasize that, in order to assess effectiveness, other variables such as the involvement of health professionals, needs to be included.

In summary: The most important added values of Starbright World are (1) the alignment with the direct needs of seriously ill teens; (2) the large-scale recognition of the program; (3) the importance given to academic research; and (4) the extensive collaboration with hospitals and health agents. By enabling the different interactive and creative opportunities of new media and digital platforms that currently exist, the game succeeds in overcoming the emotional and social isolation of seriously ill teens. The extensive social recognition and financial support for the Starlight Children's Foundation, and Starbright World, enables a worldwide deployment. The recognition of the value of academic research leads to an enhanced acknowledgement of the added value of the Starbright World and hence, has a positive influence on funding schemes and deployment. The extensive collaboration with hospitals and health agents ensures that seriously ill teens are reached.

3.5.7 Economics of the project

Development	
Total development cost (breakdown if possible)	Unknown
Industry-related contribution to development costs	2006 version 1. AOL $525.000 2. Vivendi $100.000
Sponsors (if any) and degree of involvement	2006 version 3. Hospira Foundation $162.000
Reliance on a specific source of financing and amount received	n.a.

Business model	**Public-private partnership**
Pricing strategy	Available for free.
Revenues and revenue-sharing	n.a.
Sales target	n.a.
Target break-even point	n.a.

Marketing	
Marketing strategy	n.a.
Project's sales and marketing budget	n.a.
Sales force	n.a.
Geographical scope	Children's hospitals in United States, Mexico, Canada, and Australia, Japan and UK. Recently more elaborated because of French and Spanish version of the platform.

3.5.8 Source material

Game reference

Starbright world (1996). *Worlds, Inc. & Starlight Children's Foundation*.

Starbright world (2006). *Schematic, Userplane, & Starlight Children's Foundation*. [Social network site] [Browser game]. Game website: http://www.starbrightworld.org

Consulted Websites

- http://www.starbright.org
- http://www.starbrightworld.org
- http://createjoy.vivendi.com
- http://www.mission-base.com

Literature

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Bush, J.P. & Simonian, S.J. (2002). New directions in research on starbright interventions. *Children's Health Care*, 31(1), 87-91.

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Starlight Children's Foundation. (n.d.). *Starlight and Vivendi introduce new features to Starbright World the preeminent online social network for seriously ill teens and teen siblings. Key enhancements made possible by generous grant from signature sponsor Vivendi*. Retrieved from: http://createjoy.vivendi.com/download/sites/default/files/press_room/PressRelease_SBW_VivendiGrant_09-23-10%20FINAL.pdf

3.6 Games Learning Society (GLS) – Civilization & CivWorld

Developer	***Firaxis (Sid Meier)***
Legal status	Independent Company
Year of creation	1996
Activity	Commercial Off The Shelf games development
Number of employees	App. 130
Country	US
Website	http://www.firaxis.com

Game title	Civilization & CivWorld
Date of publication	Released in 1991, continuous developments since. Facebook application CivWorld released in 2011.
Client	n.a.
Project objectives	Games Learning Society (GLS): Aims to provide support for the use of Civilization or CivWorld for learning academic content, game design or civic engagement by way of custom-designed game scenarios, curricula, case studies and teachers support tools,
Designer(s)/Editor(s)	Firaxis (Sid Meier) GSL (Games Learning Society, University of Wisconsin-Madison, Kurt Squire) Take-Two Interactive Software, Inc.
Website	http://www.firaxis.com http://www.gameslearningsociety.org

3.6.1 Game description

Civilization is a **multiplayer strategy game** that consists of creating one's own civilization by managing resources, military, engineering, and diplomacy. Each player represents a nation and competes with other player-nations to rule the world. Other players can join the game, hence creating various civilizations (Pack, 2011). Players represent a variety of individuals such as farmers, manual workers, merchants or artists and have to win battles, share technological inventions, form a government, win elections or influence the (financial) market in order to advance in the game (Reilly, 2009; Tanner, 2011).

CivWorld is the **Facebook version** of this game and shows a more simplified game play. It contains several additional features. First, CivWorld introduces and highlights the social component and the multiplayer aspect. Personal progress is made visible to all players and as such, influences the social element of the game. Second, CivWorld enables access to several mini-games and because of its simplified game design, lowers the barriers for non-experienced gamers. Players can make progress and earn bonuses by playing mini-games competing against others (Tanner, 2011). Three, several online chat possibilities are available: Global Chat - broadcast messages to all other players; Team Chat - chat only with other members of your civilization; and Personal Messages - send direct, individual messages to another player. In addition, players can block, or 'mute' a list of players.

The Civilization games were not developed for use in an educational context. On the contrary, the game design solely focuses on a fun and entertainment oriented game experience. CivWorld, the Facebook version of the original Civilization's game, was developed in order to please and convince both regular Civilization players and Facebook gamers of the fun and dynamic nature of the Civilization's game (Dembowski, 2011). All Civilization games do aim to stimulate progressive learning by using in-game rewards and a just-one-more-turn approach in their game design. As such, players feel smarter and experience a strong sense of accomplishment while having fun.

Fig. 23. Screenshots CivWorld.

3.6.2 Project background

The **Games Learning Society (GLS)** is a group of academics, game developers and private stakeholders that aim to understand and investigate the learning characteristics of Commercial Off-the-Shelf (COTS) games. In addition, they search for ways to integrate COTS games into educational programs and curricula. Whereas (serious) games for learning approaches start from the idea what learning trajectories can be brought about by and integrated in a (new) game, GLS reverses this approach and examines what learning experiences are created by the use of popular COTS game. They base their approach on the idea that nearly all children in the US are frequently playing COTS games. They state that the fact that children already know and use the COTS games lowers barriers to engagement with the game and possible learning goals. According to GLS, COTS games enable a more easy use of games for learning and other self-deployment goals. They examine in particular how COTS games have an influence on (1) the development of literacy, and academic language; (2) innovative and creative thinking; and (3) skills development and knowledge production.

Civilization is one of the games that GLS has been looking at extensively in 2005 and 2006, mainly by Kurt Squire and his team. Though **Firaxis**, the developer of Civilization, did not want to be explicitly linked to GLS and the idea of using Civilization for learning purposes, they did provide GLS the necessary working versions of the game.

The initial research question of GLS was how Civilization could be valid for learning and which kind of knowledge and skills were developed through the use of Civilization. Afterwards, the research scope was extended to also include an examination of the aspects that determine whether teachers take-up and use the games. GLS developed different teacher's guides and set up an online community on how to use Civilization in a classroom

setting. In 2009, the funding for the GLS Civilization project was terminated and the online community was eliminated. Currently, GLS focuses on learning in and around other COTS games such as World of Warcraft.

3.6.3 Target audience(s)

Civilization and CivWorld are developed for the general public and can in theory be played by anyone with a valid (Facebook) account. The target audience is not specified but the original Civilization series is recommended for players over 10 year due to drug-related, mild violence and language issues. GLS focuses on teachers and communities of teachers in particular.

3.6.4 Use context

The studies by GLS indicate that, in an out-of-the-home context, Civilization is mainly used for educational purposes in a formal learning context, and this by teachers who themselves used to be gamers, or show a particular interest in games. Main focus however lies on knowledge acquisition with regards to history and geography (Squire, DeVane, & Dugra, n.d.). It is stated that Civilization allows students to improve their factual and conceptual knowledge about history and geography; **learning that is facilitated by letting students situate their game experience in a broader context** through classroom discussions or specific non-game oriented activities (Lee & Probert, 2010). Little information is available about the use of Civilization for teaching game design, even though this is explicitly mentioned as a learning goal on the Firaxis website.

Lee and Probert (2010) state that complementary actions alongside the provision of access and use of the game, is crucial to ensure learning. They argue that availability of lectures, background readings, class discussions and critical analyses are a prerequisite for an empowerment or inclusion oriented use of Civilization or CivWorld.

The expert contacted for this case pointed out a number of **advantages related to using COTS games**. One major advantage lies in the natural and spontaneous creation of communities of practice. He argues that a large portion of learning is brought about by and within these informal communities. The fact that COTS games are already distributed, also implies that no additional publishing or marketing strategy is necessary to ensure take-up. Also, when using COTS games, sustainability tends to be more certain than for special-purpose games.

During the expert interview several **disadvantages to COTS game use** were brought up as well. A major disadvantage is the significant learning curve that characterizes games such as Civilization. COTS games are developed and designed to be played over and over again and are build according to highly complex semiotic systems that contain many game variables to ensure a nearly unlimited play time. Due to limited financial resources, many special-purpose games are of limited complexity and are characterized by short playtime. The complex design systems of COTS games, Civilization included, makes that they are accompanied by a long learning curve which makes them less attractive for teachers or others. Teachers need a certain amount of time to master the game themselves, before they can apply the game in a learning context. It implies that the digital divide surmounts. Less literate children, or those without sufficient e-skills, will be less able to learn from COTS games such as Civilization. For these children, using CivWorld might be a solution.

3.6.5 Technology

Technical Information	Not available.
Platform	CivWorld is specifically developed for Facebook.
Special accessories	Valid (Facebook) account.
Technological characteristic	Not specified.
Language	Flash-based.
Engine	Not specified.

3.6.6 Impact

From the expert interview regarding this case, we learnt that no figures are available on the actual uptake of Civilization or CivWorld for learning purposes. As learning is not one of the main usage goals of Firaxis, there is no in-game assessment system of learning in place.

GLS research does point towards a number of benefits as referred to on their website.[7] As mentioned before, the factual knowledge on history and geography improves steadily when playing Civilization. Because of representation biases in the game, **guided use** of Civilization presents an important opportunity to situate the game experience and critically address stereotypes and technological determinist viewpoints present in the game. Furthermore, it is stated that the incorporated **design** values enable some sense of empowerment: (1) By rewarding early and often, the player has the feeling that he is smart and gains the believe that he can succeed and achieve progress in the game; (2) The game is accompanied by an extensive engaging process which leads players into a so-called immersive flow; (3) The "one-more-turn" approach contributes to the feeling of progression; (4) Elements of surprise make the game more fun and create more informal learning experiences; (5) The re-playability in which actions lead to different outcomes, enhances the surprise effect; (6) The flow experience increases with each game experience, meaning, the more is known the better the flow and game rhythm; and finally (7) The games are designed in such a way that they can be played anytime and anywhere.

The impact of the Civilization game with regards to inclusion and empowerment is fourfold. First, the use of the game in a formal learning context leads to an increase in the **motivation** of disinterested students. Second, playing the game can enhance **self-confidence**, as players learn indirectly by play and experience knowledge acquisition while playing. The open-ended game play provides a tool to test presumable geopolitical outcomes and it gives the player a moderating role (Burns, 2002). Third, the **individual and collective contribution** to the development of scenarios enables a sense of empowerment. And four, experiencing some kind of belonging to a social community and an increase in social interactions, enhances social integration or inclusion.

[7] http://www.gameslearningsociety.org

***In summary**:* The main opportunities of the use of COTS games such as Civilization for inclusion and empowerment can be brought back to (1) the already successful distribution of the game which makes that there is no need for an additional publishing strategy; (2) the informal and spontaneous emergence of communities of practice that function as places where important learning acquisition and knowledge exchange submerges; and (3) the overall use of COTS games by children of various ages and backgrounds. The challenges are mainly related to digital divide issues. Less literate children and teachers that show a resistance towards ICT in general and games in particular, will be put off by the high learning curve of complex COTS games, and hence, will not engage in using them.

3.6.7 Economics of the project

Development	
Total development cost (breakdown if possible)	Not available.
Industry-related contribution to development costs	Not available.
Sponsors (if any) and degree of Involvement	Not available.
Reliance on a specific source of financing and amount received	Not available.
Business model	
Pricing strategy	CivWorld is based on a technically free to play model, inherent to Facebook. Civ Bucks, or premium game currency can be purchased via Facebook's payment system. These credits give access to additional in-game features such as enhancing throne room and city, get extra harvests, have more moves in the various mini-games and get additional gold to purchase buildings or market items.
Revenues and revenue-sharing	Not available.
Sales target	Not available.
Target break-even point	Not available.
Marketing	
Marketing strategy	Not available.
Project's sales and marketing Budget	Not available.
Sales force	Not available.
Geographical scope	Global.

3.6.8 Source material

Game reference

CivWorld (1991). *Firaxis.* [PC game]. Game website: http://www.firaxis.com/index.php

Consulted Websites

- http://www.firaxis.com
- http://www.gameslearningsociety.org
- http://www.take2games.com/

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Expert interview

- **Who?** Seann Dikkers. Researcher of educational technologies at the University of Wisconsin. Researcher and designer at Gaming Matter.
- **Role in case?** Sean Dikkers works in close collaboration with Kurt Squire, who has extensively researched the potential added value of Civilization and CivWorld for learning and personal development.
- Contacted when? March 14, 2012.

3.7 Gamestar Mechanic

Developer	***E-line Media (Originally developed by Gamelab)***
Legal status	Private Company.
Year of creation	2007
Activity	Publisher of game-based learning products and services.
Number of employees	11-50.
Country	US.
Website	www.elinemedia.com

Game title	Gamestar Mechanic
Date of publication	2010
Client	MacArthur Foundation.
Project objectives	Enhance 21st literacy skills by way of empowering youth through game design.
Designer(s)/Editor(s)	Initially developed by Gamelab, Academic Advanced Distributed Learning Co-Lab (AADL), University of Wisconsin-Madison. Currently under management of E-line media and the Institute of Play
Website	http://gamestarmechanic.com/

3.7.1 Game description

Gamestar Mechanic is an online, browser-based game that allows players to play and design various games. It consists of three components: (1) quests – e.g. various games that indirectly transfer knowledge on the principles of game design; (2) a player workshop – e.g. a game designer/creation tool; and (3) a game alley – e.g. an online community in which players can publish their own games, but also rate and play games of other players (Jackson, 2010). The game aims to increase the acquisition of 21st century literacy skills such as problem solving, solution oriented reflection or basic digital literacy skills. The game was also developed to increase participation in Science, Technology, Engineering, and Mathematics (STEM) learning.

The three components mentioned above also refer to the three phases a player should normally go through to reach overall learning objectives. Initially, participants only play games on the platform, and as such, discover how games are designed and what different game play features are possible. Afterwards they move on to game making by being asked to fix certain games. This approach implies that players need to reflect on the origin of the problem before they are enabled to fix it. Once players have mastered fixing and designing games, they will be challenged to publish their designed games in the community where they will get (1) qualitative feedback from other players; and (2) personalized quantitative feedback on components, such as playtime and depth of play, for the game they developed (Chaplin, 2010).

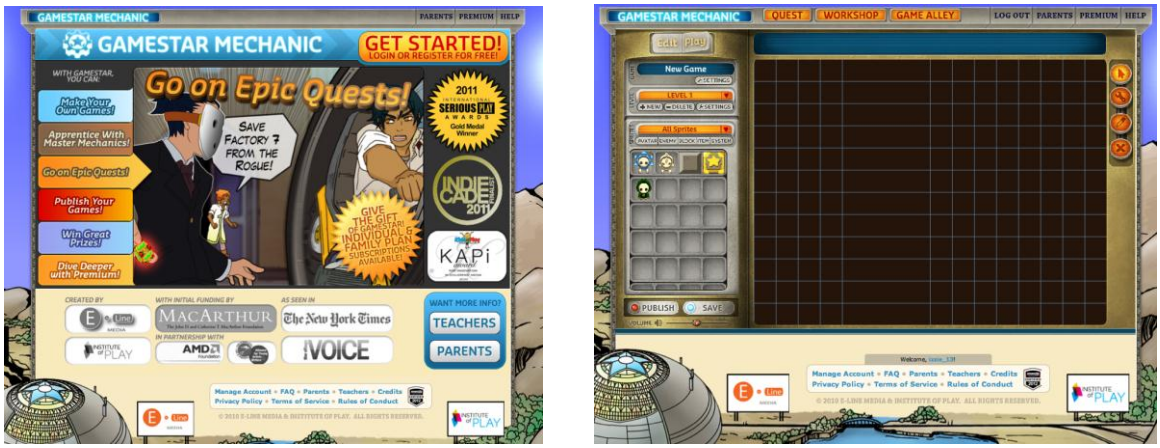

Figure 19. Screenshots Gamestar Mechanic.

3.7.2 Project background

The idea for the development of Gamestar Mechanic grew out of an **academic research** paper by Gee and Zimmerman (co-founder of **Gamelab)**, and reflected on the added learning value of game design. Gee and Zimmerman believed that a game in which the game play was based on designing new games, would allow for a learning process with regards to (1) systems thinking; (2) iterative design; (3) collaboration and knowledge exchange; (4) problem solving; and (5) digital literacies. The idea for the development of a game on game design was also based on the assumption that the use of games in a formal or informal learning context could increase student engagement and motivation by working with tools that children were already naturally involved with.

Gee and Zimmerman were able to get funding for the design and development from the **MacArthur Foundation** (Chaplin, 2010). They succeeded in producing a Beta-version of Gamestar Mechanic, but encountered serious difficulties to market the game. In 2009, Gamelab went out of business, and the MacArthur Foundation approached **E-Line Media** and Alan Gershenfeld to publish Gamestar Mechanic and to make the game commercially viable and sustainable. In order to make the game self-sustaining, a monthly subscription fee is charged for access to additional features. The basic version of the game itself is available for free online (Chaplin, 2010). The game was officially launched in September 2010 (Jackson, 2010).

3.7.3 Target audience(s)

Gamestar Mechanic targets **8 to 14 year olds**. Distribution of the game, however, is mainly targeted at **individual teachers** via presence in online teacher communities and a number of events in which designs by students are valued and rewarded. In order to achieve take-up amongst individual teachers, the pricing of the game was kept very low and the design of the game was kept very simple and easy to use. E-Line Media specifically targets individual teachers instead of education institutions, in order to avoid the necessary approval by umbrella institutions or the various school district levels. Gamestar Mechanic is also targeted towards the public in general in order to achieve take-up of the game in a home context, but this has not yet been marketed extensively.

3.7.4 Use context

Gamestar Mechanic can be used in informal and formal settings. It is currently used in school, after-school programs, community centres or libraries. The **Institute of Play**, one of the initial stakeholders, developed a comprehensive game design curriculum (Jackson, 2010). The expert consulted for this case, clarified that various support tools are made available for free in order to enable a more easy use of the game in a learning context. The game is mainly used during **Technology Education classes**, as these classes do not have a preset program. The expert interview indicated that usage in a learning context is approximately 60% of total usage, while the remaining 40% reflects use of the game in a **home context**.

3.7.5 Technology

Technical Information	
Platform	Browser-based. No download required.
Special accessories	Not applicable.
Technological characteristic	Not applicable.
Language	Unknown.
Engine	Unknown.

3.7.6 Impact

In October 2010, over 100 schools had already signed up for the Premium account. Currently, over 2,500 schools worldwide are using the game. Approximately 120,000 children are making use of the platform and so far, they have created over 100,000 games that have been played 1.5 million times.

Research by Games (2009) indicates that children in middle school develop **language and literacy skills** by playing Gamestar Mechanic. Most knowledge however is developed with regards to **game design**. By playing Gamestar Mechanic, children get an in-depth view of the pragmatics, language and semantics of game design. The study also confirms that Gamestar Mechanic helps children to **unravel problems** and develop strategies to address them.

Though the number of respondents was limited in Games' study, a large number of children from **at-risk background** were involved. The findings suggest that learning through game based learning environments or approaches could be a possible way to re-engage at-risk children. The study showed that the at-risk children, who encountered difficulties with regards to general literacy and reading, also developed strategic thinking and problem solving strategies.

***In summary**:* The added value of the Gamestar Mechanics lies in the all-round approach developed by E-Line Media, meaning that they worked out a commercially viable and sustainable publishing strategy alongside the game as such. A second major asset is the added learning value with regards to the development of 21st literacy and digital skills. Many of the skills that are developed by way of Gamestar Mechanic can be transferred to other life areas, such as for example problem solving capacity or systemic thinking.

3.7.7 Economics of the project

Development	
Total development cost (breakdown if possible)	App. 1 million $
Industry-related contribution to development costs	Unknown.
Sponsors (if any) and degree of Involvement	MacArthur Foundation. AMD Foundation. Alliance for Young Artists & Writers.
Reliance on a specific source of financing and amount received	Unknown.
Business model	
Pricing strategy	Basic online version available for free. Monthly subscription fee for additional features (Premium Account): 5,95$/month.
Revenues and revenue-sharing	Unknown.
Sales target	Unknown.
Target break-even point	Unknown.
Marketing	
Marketing strategy	Targeted at individuals teachers via online teacher networks and game design events and competitions.
Project's sales and marketing Budget	Unknown.
Sales force	Unknown.
Geographical scope	US.

3.7.8 Source material

Game reference

Gamestar Mechanic (2010). *Gamelab*. [Browser game]. Game website: http://www.gamestarmechanic.com

Consulted websites

- http://elineventures.com
- www.gamestarmechanic.com

Literature

Chaplin, H. (2010). *Novel Public/Private partnership brings 'Gamestar Mechanic' video game to classrooms*. Retrieved from http://spotlight.macfound.org/featured-stories/entry/novel-public-private-partnership-brings-gamestar-mechanic-video-game-to-cla/

Games, I.A. (2009). *21st Century Language and Literacy in Gamestar Mechanic: Middle school students' appropriation through play of the discourse of computer game designers.* Unpublished dissertation, University of Wisconsin-Madison. http://gamestarmechanic.com/static/pdfs/Games_PhD_Gamestar.pdf

Jackson, S. (2010) *Want to teach STEM skills and game design? Sign up to Play Gamestar Mechanic.* Retrieved from http://spotlight.macfound.org/blog/entry/want-to-teach-stem-skills-and-game-design-sign-up-to-play-gamestar-mechanic/

Expert interview

- **Who?** Brian Alspach. Executive vice-president, General manager at E-line Media, a company that publishes game-based learning products and services.
- **Role in case?** Brian Alspach is part of the team that developed and published Gamestar Mechanic at E-Line Media.
- Contacted when? March 14, 2012.

4. Framing DGEI

In the previous sections, we explored the concepts of inclusion, empowerment and digital games, and we reviewed the state of the art in the field and analysed a series of relevant case studies. In our exploration of the use of digital games to promote empowerment and inclusion (DGEI), specific attention was paid to how learning and participatory processes form a link between playing digital games and social inclusion. This choice was motivated by the fact that digital games are increasingly being recognized as engaging learning media and the fact that digital gaming practices are seen as an important part of participatory culture.

An examination of these phenomena in order to understand how digital games can support empowerment and inclusion makes sense given the fact that we adopt a broad understanding of the concept of learning. Thereby learning is not understood as knowledge acquisition or restricted to a formal educational setting. Instead, it is seen as a process of change in knowledge, skills, (motivational) attitudes and/or behaviour that can take place in formal, non-formal and informal learning settings, that shapes and is shaped by the physical and socio-cultural context in which it takes place and that is not limited to the individual but can extend across a community of learners.

This broad conceptualization of learning comes close to Klimmt's description of social change, a concept that he distinguishes from learning and development in the narrow sense: "[S]everal communication goals have to be achieved if social change is likely to occur, including changes in beliefs and attitudes, learning how to perform selected behaviours, (e.g., how to become an organ donor or how to use a condom), and instilling motivation to change among members in the targeted audience." (Klimmt, 2009, p.248). Klimmt emphasized that social change can and should be considered at various levels: individual, group and societal level. This is, at least in part, what makes the design, implementation and assessment of DGEI so challenging.

This wider scope allowed us to discuss a wide range of DGEI research studies and practices, but may nevertheless have left some of them underexposed. Social change organizations can deploy digital games also as practical tools for civic outreach, e.g. for crowdsourcing, or use them to support identity and relationship development (Stokes, Seggerman & Rejeski, 2006).

In what follows, we would like to synthesize the information we gathered in a preliminary framework for understanding the usage of digital games for empowerment and inclusion. This is organised according to the following questions:

1. Why (should) DGEI work?
2. Which approaches exist and which opportunities and challenges do stakeholders face?
3. Who is involved in DGEI and how can the role of these stakeholders be facilitated?
4. What are the foundations of successful implementation of DGEI projects in which games are specially made for the purpose of inclusion and empowerment?

4.1 Learning and participation surrounding DGEIs

Throughout this study it has become apparent that digital games have the potential to promote empowerment and social inclusion by facilitating learning and participation in various ways. These different, yet interlinked, facets of learning and participation are summarized in Figure 20. In what follows, we concisely discuss and situate each of them.

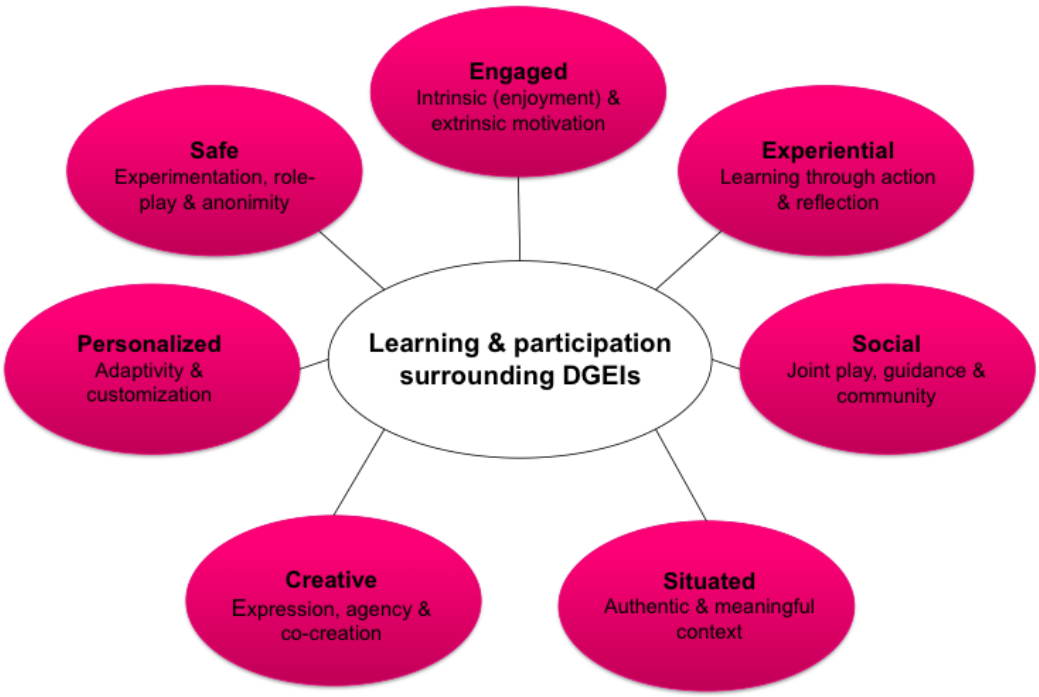

Figure 20. Why (should) DGEI work?

4.1.1 Engaged

In the context of empowerment and inclusion, stakeholders that wish to (re-)engage people in a particular activity can make use of game play in several ways. The most straightforward relates to the **intrinsically motivating** power that game play can hold. Indeed, for many, especially those who grew up with digital games, playing well-designed games and/or making games is considered an enjoyable activity, giving them a sense of confidence, belonging and autonomy. Hence, integrating activities related to learning and participation into digital games has been one approach to harness their motivational power.

Another approach lies in the recognition that an interest in digital games can drive people to other activities in support of game play/making that are part of the **gaming ecology**, such as reading game-related resources (Steinkuehler, 2011). Yet others try to capture the design elements that make digital games enjoyable and integrate them into non-play activities: this is often referred to as **gamification** (Deterding et al., 2011).

When digital games are used for a purpose beyond mere entertainment, however, people may also choose to play in recognition of its instrumental value. Such a richer form of **extrinsic motivation** resembles intrinsic motivation and is encouraged by a social context that stimulates empowerment in a caring, yet not over-controlling way (Deci and Ryan, 2000).

Whatever the type, the motivation to participate in an empowerment or inclusion initiative will not come from the digital game in isolation. Intermediaries, family members or neighbours can not only introduce people to game-based initiatives but also motivate them to continue to participate and to make the link between in-game and out-of-game experiences. Through exchanges with others, participants can learn from their experiences and become part of a **community** of interest.

4.1.2 Experiential

Advocates of digital games as learning tools have pointed to the links between game play and learning experiences. This claim is associated with the constructivist or **experiential perspective on learning**. According to this view, experience plays a key role in the learning process; learning is seen as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38).

Several game researchers and theorists have used experiential learning theory to understand game-based learning. As people play they encounter obstacles, need to solve problems and gain understanding of the, at times highly complex, game system to make progress. Authors such as Garris, Ahlers and Driskell (2002) and Ulrich (1997) refer to the **game cycle** of continuously adjusting action to feedback given during game play and to the combination of **game play and reflection** as ways in which the learning process takes place.

Garris, Ahlers and Driskell (2002) describe the game cycle as follows. Through game play, a person is confronted with particular game features that trigger particular judgments or reactions such as interest, enjoyment, involvement, or confidence. These reactions in turn lead to behaviours such as greater persistence or intensity of effort. These behaviours result in system feedback on performance in the game context. This system feedback leads to new user judgments and the continuation of this game cycle feedback loop.

In essence, being interactive systems, digital games are highly apt to experiential learning. During game play, players learn by doing through interaction with the game system but also, as Ullrich (1997) and Garris and colleagues (2002) point out, through feedback from others. This brings us to the next element of learning and participation.

4.1.3 Social

Game-based learning can be further supported and improved through communication with those guiding the process (mentors, guides, counselors, ...) and fellow learners (Garris, Ahlers, & Driskell, 2002). Social interaction with fellow players in the game or conversations afterwards that highlight key concepts and link in-game to out-of-game events can provide a **scaffolding** to lift the learning activity to a higher level. Crookall (1995) and Petranek (2000), for example, have described positive effects of such scaffolding in the context of simulation.

Digital games have the potential to **improve social skills** and **foster communities** of practice in which knowledge is shared informally and members feel accepted and respected. For those at risk of social exclusion, this is highly relevant. Being able to interact meaningfully with family or friends and to identify with a cultural group or community and to feel recognized by others is a key part of societal participation. Those who can fall back on a strong social network will also feel supported in engaging in activities they might not feel confident to undertake alone.

In essence, all digital games can become the subject of a community of people with shared interests. In some cases, however, this process is reinforced by offering **in-game social interaction** and through **active community support** around the game (e.g. social network games, modding groups, discussion forums). Whether one is willing to identify with such a community is likely to depend on the extent to which one can identify with how players are represented in the game.

4.1.4 Situated

Both game play itself as well as the virtual, physical and social context in which it is set can act as a way to situate learning. The notion of situated cognition was first described in educational psychology by Brown, Collins and Duguid (1989). It is a specific expression of the situative perspective on learning that we referred to earlier in the report. It refers to the idea that, only by conveying knowledge **in context** and illustrating it in the authentic situation of use, complete understanding can be achieved in a way that people learn how to use this knowledge (Brown, Collins, & Duguid, 1998).

Digital games have the potential to offer a narrative and immersive environment and social community in which players have an experience that feels **authentic**. People that participate in a game or game-based initiative do not enter it as a tabula rasa, but with their own set of prior experiences, beliefs (e.g. self-efficacy), motivations to participate, and emotional state; all related to the socio-cultural context in which they are situated. Game play provides an opportunity to engage in interest-driven learning (see Jenkins, 2006b; Ito and Bittanti, 2010, both discussed earlier), where they can relate what is being learnt to what interests them.

From this perspective, it becomes clear that, if we wish to approach those at risk of exclusion through digital game use, we should situate it in the scope of a broader project that accounts for their social situation, current gaming practices, and other interests and activities they are already pursuing.

4.1.5 Creative

Digital games can also be a site for creative learning and participation. As we have described, the **constructionist perspective** on learning attributes particular importance to the role of 'making' in this process (Ackermann, 2001). When creating an artifact, people need to find a way to make most of the tools they have access to at that point to make their ideas materialize.

Creative expression surrounding digital games can take place in more or less formalized ways. Making and sharing games and game modifications have become part of youth culture. Researchers and practitioners experiment with co-creation workshops in which they encourage people to actively participate in creating games. In some cases, such participatory design methods are deployed to create games for their own community.

Through game making, participants can acquire digital skills, break out of their social isolation and positively contribute to their community. Several authors have argued that a participatory approach is a promising route to empowerment. It presents a way to avoid that existing power relationships are reinforced (Lim, 2008; Prensky, 2008) by giving people a sense of agency (Sime, 2008), thereby increasing the chances at success of an e-inclusion initiative (Teles, & Joia, 2011).

4.1.6 Personalized

Digital games afford a highly personalized experience: a single play session is always unique as it emerges from the interaction between game and player(s). **Personalization** has been put forward as one of the key principles to optimize learning by Moore and Anderson (1969). For this to occur, the environment in which learning takes place needs to be responsive to the learners' actions and help him or her reflect on one's self as a social being.

Digital games allow for such personalization to take place in various ways. As players navigate the game space, they constantly receive feedback on their actions and they can compare their performance to that of others. In addition, **they can customize their experience** by personalizing their character or selecting their preferred difficulty level or play style. Finally, the game environment can adapt its shape and the learning tasks it presents to the user according to certain criteria such as previous knowledge or skill making the experience both more enjoyable and more effective.

In the context of empowerment and inclusion initiatives, the possibility to reach out to those at risk in a highly individualized way presents a welcome opportunity. Continued participation in education and training, for instance, is shaped by the degree to which people can be guided and mentored in a personalized manner. It has been explicitly stated that the highly different needs within at-risk groups require **a tailored solution** instead of a one solution fits all approach (Communities and Local Government, 2008b).

4.1.7 Safe

Digital games can provide a safe environment, in which people can **experiment** without suffering the consequences and where they can discuss topics that may be difficult to bring up in everyday life. Many digital games enable **perspective-taking** through role-play and a range of digital games allow their players to act and communicate anonymously. The ability to approach an issue from different viewpoints has been put forward as an important learning principle (Moore & Anderson, 1996). The ability to engage with each other **without having to disclose one's identity** has been suggested to make players feel more equal to each other and thereby less restrained than in everyday life (McComas, Pivic & Laflamme, 1998).

This aspect of learning and participation using digital games is relevant for social inclusion initiatives as people at risk have often become disengaged because of negative experiences they had in the past. In the context of a positive and playful environment where they feel they can discuss their feelings and experiences more openly they may gain some of the confidence they lack in other contexts.

4.2 Three DGEI approaches: opportunities and challenges

As became apparent in our report, approaches that seek to empower and include people by using digital games that foster learning and participation can be roughly divided into three groups:

1. Special-purpose: Developing digital games for learning and participation
2. COTS: Harnessing learning and participation in and surrounding well-designed commercial off-the-shelf (COTS) digital games
3. Co-creation: Learning and participation by creating and modifying digital games

In what follows, we briefly recapitulate each approach and point out the main opportunities and challenges that it presents for stakeholders in this domain (i.e. at-risk target groups, intermediaries, developers, decision-makers, ...). This discussion is based on findings from our literature review, case studies and contacts with experts (i.e. in the expert interviews and the DGEI Expert Workshop). An overview can be found in Figure 21. Before going into each approach separately, we first discuss opportunities and challenges that appear to be common to all three.

Figure 21. Three DGEI approaches with their opportunities and challenges

4.2.1 General opportunities and challenges

Stakeholders seeking to empower those excluded from full participation in everyday life are faced with a number of barriers they hope to overcome by involving digital games in their inclusion initiative. Indeed, DGEI initiatives come with a number of opportunities both for those at risk and for those trying to improve the condition of those at risk.

DGEI initiatives can play a role in countering the lack of motivation to engage in empowering activities as they hold a promise of a more **engaged form of learning and participation**. **Intermediary involvement** is crucial here; gatekeepers working and living with people at-risk will facilitate the process of reaching out to this group and can guide them through usage of the game.

The **broad range** of game platforms, genres and (re-usable) technologies also presents an opportunity to find an appropriate solution for a particular target group including previously **untapped audiences**. Klopfer, Osterweil and Salen (2009), for instance, describe how the advent of platforms such as the Nintendo Wii and game genres such as casual games have widened the audience of digital games. **Online and mobile platforms** particularly deserve our attention. They enable target users to be reached across different settings. Aside from ubiquitous access, online platforms offer a space where people can engage with others anonymously. Global penetration of mobile-cellular subscriptions (87% globally, 79% in developing countries according to ITU World Telecommunication/ICT Indicators database) shows that mobile devices are a relatively democratic, low-cost platform, which is suitable to a sector in which resources are limited.

We would be overly optimistic, however, if we would not balance this account with the challenges that remain for DGEI. One of those is the **negative perception** of digital games that can be found among target users, intermediaries and policy makers. Some remain skeptical of the effectiveness of digital games as empowerment tools and this is not helped by the **lack of standards on impact assessment** that complicate gathering and presenting evidence systematically. Those intermediaries who do show enthusiasm for the potential of digital games are often faced with a **lack of organizational, technical, infrastructural, financial and pedagogical/agogical support for intermediaries**. This is further complicated by the fact that **both the tool they wish to use and the audience they are dealing with are highly dynamic and complex**; games (technologies) have a short lifecycle and those at risk may be so because of different reasons and these reasons may change.

4.2.2 First approach: Special-purpose

In the first approach, games are developed specifically for the purpose of empowerment and inclusion. It considers how game design can be optimized for the given target audience, objective and implementation context. Game design can be informed both by the practices that are being designed for as well as theoretical and pedagogical approaches.

The possibility to **match up design with the target audience and goals** is one of the major opportunities tied to this particular approach. It allows setting up e-inclusion initiatives for which barriers to entry are minimal, provided that effort is invested in getting to know the target audience. Government or other **funding** mechanisms (grants, tax shelter, ...) for development as well as **public-private partnerships** can give a much needed boost when this approach is taken, bringing in necessary finances and expertise (e.g. in game design).

Indeed, one of the challenges to this approach lies in making the most of **limited resources** (e.g. budget and design expertise) and dealing with constraints (e.g. trading off playability against usability within the use setting) to create a product that is of sufficient quality. What does not help in this respect is that some game developers are unwilling to

put their expertise to use for special-purpose games. Even more so, however, the challenge lies in **ensuring that the audience is reached in a sustainable way**. In this respect, investments in game development do not suffice. And when costs to market and follow-up on a digital game cannot be covered, even a promising special-purpose digital game can eventually be abandoned. Finally, this approach also brings to the fore a number of issues with regard to **privacy and trust**. One example is the fact that special-purpose games allow assessment to be built into the game, which brings up issues of confidentiality. Furthermore, if those guiding people at risk are also asked to assess them this can put a strain on their trust relationship.

4.2.3 Second approach: COTS

The second approach starts out from a different perspective. By looking at commercial off-the-shelf (COTS) digital games that are well-designed and by discovering the kind of learning and participation naturally happening in and around those games, it considers their potential use in the context of empowerment and inclusion for a given target group and setting. This may involve bringing games into a particular setting or starting out from commercial-off-the-shelf games that are already being played.

By **making use of the existing digital games market, culture and practices**, this approach avoids some of the issues inherent to the special-purpose approach. First, using or modifying existing digital games helps keep development costs under control, while still being able to make use of a game that has a **high production value** and offers extensive playing time. Secondly, as these games are **already being marketed and maintained**, one can link up to the communities that have emerged around the game, which can raise the impact of the approach. Finally, the fact that these games are marketed as entertaining may facilitate adoption whereas digital games explicitly labelled as special-purpose may be perceived as less attractive. Indeed, as we have discussed earlier, research shows at-risk groups have access to and engage with digital games. By looking at empowerment opportunities surrounding digital games that at-risk groups are already playing, intermediaries in the social inclusion domain who are faced with limited resources can capitalize on investments already made by the game industry. They can work with digital games that may not only be more appealing to but also potentially **more acceptable and less stigmatizing** for at-risk groups as they are not presented as learning tools or as solutions to a problem.

While using a COTS game may help to avoid certain costs, however, it does not eliminate them. Intermediary organizations dealing with social inclusion may not be able to purchase the games or the required hardware. Furthermore, intermediaries are faced with the challenge of choosing which digital games should be the focus of their approach. If not carefully prepared, a **mismatch between the challenge posed by the game and the players' skill set** may emerge. In this case, those getting to know the digital game will be put off by the steep learning curve and abandon it. For those at risk, this is likely to be yet another negative experience that further reduces the confidence in their own abilities. Another mismatch may arise when digital games are selected that are in line with the preferences and skills of those at risk, yet present content and playing experiences that diverge from the envisioned empowerment goals. For example, a game may make inappropriate, erroneous assumptions about certain facts or procedures (i.e. **representation bias**). This can, however, be turned into an opportunity for reflection and

discussion among peers and intermediaries guiding the process. Finally, **in-game assessment may be virtually impossible** to do.

4.2.4 Third approach: Co-creation

In the third approach, people are given the opportunity to participate in game-making activities. This can range from simply allowing people to modify a digital game to participation in the design of a complete game.

The **participatory approach** of involving people in the creation of a digital game presents an important opportunity for those working to promote social inclusion and empowerment and their target audience. It can help those at risk – and intermediaries working with them – to increase their sense of agency, to explore their creativity, to build digital literacy skills and to ensure their voices and needs are heard. When such an approach leads to the creation of a game that is actually intended for them and their peers, it is likely to facilitate adoption of the game. An important facilitator for this approach is the **availability of free or low-cost tools and platforms** that enable people without programming knowledge to create digital games and to share them. Related to this, certain digital games also come with functionality for modifying them. While this is not a given, this approach can link up to **game design education**. On the one hand, participants may become interested in further increasing their game design or more general ICT skills within an educational program. On the other hand, educational institutions may encourage aspiring game designers to conduct participatory projects.

A challenge to this approach is that it requires people's dedication to making a digital game, which is **more work-intensive** than asking people to play and requires more support. Many of the tools that are relatively easy to use still require a significant amount of learning and participants may be disappointed when they are not able to create the type of digital games they usually play. More elaborate tools offer more possibilities, but are also more demanding. Hence, **ensuring that people set out with the right expectations** is key. Gamestar Mechanic, one of the cases we discussed, presents an interesting example of how these challenges can be dealt with. People are introduced to digital game making gradually and discover in a playful manner what kind of games they can make.

4.3 Stakeholders in the DGEI ecosystem

Earlier in the report, we proposed a preliminary eco-systemic framework illustrating the different types and complexity of stakeholder involvement in DGEI projects. Within a single DGEI project, several actors work together, often taking on multiple roles at the same time and conducting activities in parallel. Here, we highlight the main DGEI stakeholders and we consider what we have learned about the roles they play and how that role can be facilitated (see Figure 22 for an overview).

Figure 22. Highlighting key stakeholders in the DGEI ecosystem.

4.3.1 Intermediary organizations and practitioners

One of the main stakeholder groups in the DGEI ecosystem is that of intermediary organizations and practitioners. This group is diverse, including more and less institutionalized actors. Examples of organizations range from unemployment offices, social housing offices and formal education institutions to neighbourhood and community centres, poverty organizations and telecentres. Within these organizations, professionals – such as youth and health workers, social assistants, teachers – come into contact with or actively work with people at risk.

With regard to DGEI initiatives, stakeholders in this group can take up several roles. As **initiators**, they can be part of the foundation of a DGEI project, starting out from their own experience and searching for funding and partners to address a specific issue. As **domain experts**, they can be consulted at the start of and throughout a DGEI project. As **gatekeepers**, they may have the power to help other stakeholders reach at-risk groups. This is particularly true for those organizations that provide everyday services to those at risk and have built up a trust relationship with these groups through their services. Finally, as **implementers** they can shape a DGEI project by actively contributing to its operationalization: introducing, enabling and guiding DGEI usage.

From this perspective, intermediary organizations and stakeholders may be stimulated in several ways. First, by **sensitizing** them regarding the potential of digital games for social inclusion and empowerment they may become more inclined to start up or be involved in DGEI initiatives. In addition, **facilitating** implementation would also be useful. This could

involve issuing documentation on how to use digital games in the professional context of intermediaries, but also considering how their professional context can be changed to accommodate such use. Practitioners could also be made familiar with digital games and DGEI applications as part of their **professional development**. Finally, **exchange** could be stimulated between those acting in the social inclusion field and those professionally creating games. This means an exchange of expertise, but also of other resources as intermediary organizations often lack the means to invest in the acquisition, let alone the development, of games.

4.3.2 At-risk groups

A second stakeholder group consists of people at risk. As a target audience for e-inclusion initiatives at-risk groups are highly diverse. People can be at risk of social exclusion in one or more areas and their situation can change rapidly over time.

While it may seem most obvious to consider at-risk groups as **adopters** – the target group of end-users whose circumstances one aims to improve through e-inclusion – this conceptualization of their role ignores the possible contribution that people at risk can make to such an initiative. They can act as **representatives** and voice the needs of their group. Furthermore, they can be actively involved as **design partners** in the initiative, which is an empowering activity in itself.

Having come to this understanding of the roles that at-risk groups can play, how can we facilitate them? As just mentioned, a participatory approach can be applied to **involve** at-risk groups from the start of a project. To then promote adoption of DGEI and the initiatives that make use of them, it is important to take into account the particular target group's **skills and interests** with regard to digital games (e.g. preferred platforms and genres), but also with regard to other areas (e.g. which places they frequent, which they avoid). The digital game that is introduced should **not just be about reaching empowerment goals**, but also, arguably first and foremost, be enjoyable. Finally, it should not be assumed that a digital game will work independently; the way its usage is **supported** and embedded within a wider project is of the utmost importance.

4.3.3 Researchers and developers

Two other important stakeholder groups are researchers and developers. While we did find examples of game developing companies that are creating digital games for empowerment, we observed that many special-purpose games are developed within an experimental, research context.

In such an experimental context, researchers can act as developers or cooperate with private game developing companies to **create** a digital game. They can take on the role of **investigators**. As such, their research may inform design of the game based on existing empirical evidence, including input from intermediaries, and theorization on learning and empowerment. Also, they may be involved in impact assessment. Once a prototype is available, however, they (together with their partners) may unexpectedly find themselves in the role of '**accidental publishers**' (Gershenfeld, n.d.) struggling to deliver a sustainable product and to identify appropriate distribution channels.

The activities we just referred to can be stimulated by promoting applied research to investigate the impact of game-based inclusion initiatives and fundamental research into

social inclusion, digital games and their mutual relationship. In addition, exchange can be supported both in the form of best practices among developers, as well as between developers and social inclusion intermediaries. Finally, support should be extended beyond mere game development to marketing, distribution and follow-up so as to avoid that the functioning of certain initiatives peters out due to lack of maintenance or support problems.

4.4 Towards successful implementation of DGEI projects

When a choice is made to develop a game specifically for empowerment and social inclusion purposes, the key question is how to optimally set up such a project. Based on this explorative study, including the obstacles and success factors we observed in the case studies, we can only begin to piece together the crucial components for the successful implementation of a DGEI project. Overall, what has become clear is that DGEI projects require a multi-stakeholder and stepwise approach. We first dedicate a section to this notion and then continue with an outline of some of the fundamental building blocks needed for a successful DGEI project. These key pieces are visualized in Figure 23.

Figure 23. Some crucial building blocks for a successful DGEI project.

4.4.1 A multi-stakeholder and stepwise approach

As Phipps (2000) argues, and as we have discussed in the report, social exclusion refers to multi-dimensional, context-embedded, dynamic processes inherent to failure of civic, economic, social and interpersonal integration systems. Hence, initiatives dealing with such issues should take a multi-stakeholder, integrated approach. This also holds true when contemplating the use of digital games. We cannot expect a game to resolve complex societal problems in itself. Furthermore, even when a particular empowerment goal is set (e.g. enhancing particular employability skills), several types of stakeholder roles and expertise are needed to arrive at an effective approach.

Intermediary organizations play an important role in several ways. Through the trust relationship they maintain with at-risk groups, they are gatekeepers that can introduce a game-based initiative to people that might otherwise be hard to reach. This is particularly

true for comprehensive gatekeepers, who offer services relevant to the everyday life of at-risk groups, and informal gatekeepers. Going via formal gatekeepers (e.g. formal learning institutions/settings) may be less effective for at-risk groups, but still presents a valid path for those who are engaged in formal education. Intermediaries also play an important role in the implementation of game-based initiatives as they can guide and motivate participants throughout the empowerment process from entry to incorporation.

Other important types of expertise and resources include game design, publishing, finance and experience with the target group. These require partnerships between game developers and intermediaries, working with publishers or finding resources on how to create a game that is sustainable and how to market it effectively, working together with funding organizations or obtaining grants from governmental institutions. Expertise about the target group (in terms of game play, but also of their everyday life) can be acquired through needs and requirements analysis, but can also be incorporated in participatory approaches.

Stakeholders may find it difficult to assess the impact of their initiative. This requires making a joint decision on what is considered a valuable outcome, who should assess it and how it should be assessed. Given that learning can take multiple forms, multiple dimensions of social exclusion and inclusion, different types of value that different stakeholders seek to create, agreeing upon outcomes can be a daunting task. Should the focus be on quantity or quality of engagement, on in-game or out-of-game assessment, on knowledge building, skill acquisition, communication, authentic practices, or all of these? Who should do it? Placing the role of assessor in the hand of those that work with at-risk groups may also compromise the relationship with them.

4.4.2 Crucial components

Whilst we believe that identifying key components to the successful implementation of DGEI initiatives is still very much a work in progress, we have attempted to identify a few key elements that we have derived from our study.

Funding and sustainability

While it may seem obvious, the need for a sound financial plan which takes into account **all aspects of researching, creating, marketing and supporting initiatives** using DGEI is a formal prerequisite for a successful project that is often given too low a priority. Several possible types of funding present themselves such as public or private whereby **mixed funding** should be considered. In this case, public funding is used to research and initialize the project and the costs for implementation, maintenance and support are taken up by private partners coupling it with a viable **business model**.

Research and development

Pre-production is arguably as important as production itself in achieving a successful DGEI project. **Background research** on the topic at hand but also evaluation of existing games on the same or similar topics should inform decisions on the design path that is followed. Next, successful projects usually respond to concrete needs of end users, but also, and possibly more significantly, of intermediaries. Hence creating a game concept and outline should take place in as close a collaboration with a broad variety of stakeholders. This stage in the development process should be given ample time and attention as **changes in the design plans are still relatively cheap at that point**. For this reason, as in the commercial games industry, it is advisable to make a highly detailed game design

document and development plan so as to keep the production time, during which design changes are expensive, as low as possible and thus reduce cost.

Marketing and distribution

A rule of thumb in the commercial games industry is that marketing a game should be budgeted as high as developing it. Whilst this does not apply to DGEI, it does underline the importance of a **well thought-through marketing plan**. Creating a high-quality game, even on all of the above described dimensions, does not automatically lead to successful diffusion. Particularly in the case of DGEI, certain population groups can be hard to reach. Therefore, again, **strong partnerships** with stakeholders working with these groups should inform any decisions on how to approach them. Furthermore, single-shot strategies can be risky. Instead it is advisable to aim for a **broad, multi-channel communication strategy** stretching over a certain period of time.

Follow-up

This pertains to a number of activities that require ongoing investment in DGEI (initiatives) well beyond their creation and introduction. It includes **maintenance**; ensuring that quality of the platform and related services is guaranteed and that improvements are made when the needs of the target group evolve. Another activity is **support**; both technical support for the digital game as well as functional support to facilitate usage within the setting of use (e.g. through documentation). Related to this, **training** of those implementing the digital game is likely to enhance its effectiveness and successful diffusion. Finally, **assessment** should be a key part of the DGEI project; this involves evaluation of the usability and playability of the digital game itself as well as longitudinal and multi-level evaluation of the impact of the initiative. The latter will inform stakeholders on the presence of short- and long-term impact.

5. Conclusion

Based on the literature survey, case studies and expert consultations, we can conclude that the use of digital games for empowerment and social inclusion carries significant potential yet that there are still knowledge gaps and policy opportunities that need to be addressed. Based on our findings, a number of recommendations can be formulated. First, we will deal with research recommendations and then move to more general policy opportunities to stimulate the efficient application of digital games in initiatives for empowerment, inclusion and related areas.

5.1 Need for action: research

Digital games are being advocated as powerful motivational and learning tools for various reasons yet a number of these claims remain hypothetical and require further exploration and validation through empirical research.

Overlooking research, theory and practice with regard to games for empowerment and inclusion as reported in length in the section State of the Art, we can observe the following knowledge gaps, areas where there is no or only limited research available:

1. **Game adoption, usage and experience by at-risk populations:** which games they are playing (game genres, platforms, etc. and how they are playing them (where, when, with whom, ...).
2. **Game use for social change in non-formal and informal learning settings**: role of the game beyond the classroom, and all aspects of the implemented approach, for instance, the role of the intermediary.
3. **Impact of digital games on social inclusion**: whether and how the use of digital games can promote re-engagement of at-risk groups in every-day life (question of transfer and of impact within other practices, including learning).
4. **Interpretive research that contextualizes game use** (e.g. domestication, ethnographic tradition, ...) looking to situate game use in context, in general, and in the context of social inclusion, in particular.
5. **Benefits and risks tied to gamification:** use of game mechanics in non-gaming activities.
6. **Publication bias for studies with a positive result:** lack of lessons learned about failure of game-based approaches.
7. **Crossing the gap between research and industry:** need for a translational initiative connecting academic and industry knowledge.

Based on these results the following research policy recommendations are proposed.

1. Stimulate research into game experience, usage and effects taking into account the diversity in gamer populations and practices
2. Stimulate research on technical tools to facilitate and improve development and distribution of digital games
3. Stimulate research into the complex ecology in which inclusion initiatives that make use of games operate.
4. Stimulate Living lab research in which formal, non-formal and informal learning settings and communities act as field laboratories to collect further evidence regarding the motivational and learning potential of digital games.

Recommendation 1: Stimulate research into game experience, usage and effects taking into account the diversity in gamer populations and practices

The knowledge gaps show that continued research into game play, practices surrounding game play and their use is necessary, specifically into:

- Their role and effectiveness in motivating people and promoting change
- The relations between motivations, enjoyment, learning, attitudes and behavioural change
- Drivers and barriers to adoption and usage of games by at-risk groups
- Specific topics of interest: identity formation

Recommendation 2: Stimulate research on technical tools to facilitate and improve development and distribution of digital games

Continued research is needed on technical tools to extend the potential of digital games and to lower the barriers to their development and distribution. One possible strategy could be to organize a survey among developers regarding their needs and organize policy initiatives accordingly.

Recommendation 3: Stimulate research into the complex ecology in which inclusion initiatives that make use of games operate.

To fully understand the opportunities and challenges related to using games in the context of empowerment and inclusion, there is a need for research that evaluates and compares the workings of different ecologies in which games for empowerment and inclusion are developed and operate.

Recommendation 4: Stimulate Living lab research in which formal, non-formal and informal learning settings and communities act as field laboratories to collect further evidence regarding the motivational and learning potential of digital games.

In view of the above recommendations, **living lab research** in which formal, non-formal and informal learning settings and communities act as field laboratories for different game-based inclusion and empowerment approaches (using special-purpose games or COTS games, making games) is recommended. This will enable longitudinal quantitative and qualitative research into the role of different factors and the interaction between them in fostering empowerment and inclusion among those at risk of being excluded. Research opportunities include but are not restricted to:

- Role of game characteristics (genre, mechanics, graphical design, …) in game adoption, implementation and usage
- Gaming experience, usage and effects
- Links between attitudes, gaming effects, learning and behavioral change
- Implementation strategy (alignment with existing practices, use of other media, …)
- Intermediary organizations (attitude towards games on institutional and individual level, experience with using games, …)
- Segmentation and profiling of different target groups: their needs, requirements and wishes
- The social context of digital game usage, its participants, setting and meanings.

5.2 Areas of action for stakeholders

Apart from stimulating the uptake of the research recommendations presented above, stakeholders in the constituencies of DGEI can consider action in the following areas:

1. Stimulate **development and distribution** of digital games for empowerment and inclusion.
2. Promote usage of games for the purpose of inclusion and empowerment among **intermediary organizations**.
3. Inform **the general public** on the potential benefits of games and break existing stereotypes
4. Encourage game-based inclusion and empowerment projects which conform to certain **requirements**
5. Drive the development of innovative measurements of and standards for **impact assessment** for game-based approaches/projects for inclusion and empowerment

Recommendation 1: Drive the improvement in **development and distribution** of digital games for empowerment and inclusion:

- Developers need to **market games more broadly across Europe**, making them available in other regions, customizing them to other audiences adapted to local contexts (e.g. language, geographical points of reference, ethnicity) to create optimal engagement, and should seek assistance in doing this if required.
- Address the potential for **game development to be included in subsidy policies and financial support systems** (e.g. tax shelters) on an equal basis with other media of member states
- Funding should requested and provided for **support beyond game development** as such to marketing and providing maintenance and support for games
- **Knowledge sharing should be developed**: dissemination of research findings to practitioners, sharing examples and best practices (for instance formation of social networks connecting developers, intermediaries, researchers, ...)
- **Participatory design approaches** (in which direct and indirect stakeholders are involved in game creation) need included **in courses** for aspiring game developers and designers
- Digital games should be included in a **cross-media strategy** (development and distribution).

Recommendation 2: Promotion of the usage of games for the purpose of inclusion and empowerment among **intermediary organizations**. This requires:

- Raising **awareness** of the potential of games for inclusion and empowerment
- Stimulating a more positive **attitude** towards ICT in general and games in particular
- Stimulating **training** for intermediary organizations on when and how to fit games into their practices. Training will have a positive influence on the effectiveness of the inclusion initiatives in which games are being used. It may also act as a distribution channel via which games are suggested and promoted.

Recommendation 3: Inform **the general public** on the potential benefits of games and break existing stereotypes:

- Stakeholders need to work to inform the general public on the potential benefit of games, issue campaigns that question stereotypes and counter myths concerning games and support new media literacies through participation (e.g. by setting up spaces, communities where people are offered a guided exploration of digital media together with peers).

Recommendation 4: Encourage game-based inclusion and empowerment projects, which conform to certain requirements.

With regard to game-based inclusion and empowerment projects applying for funding, projects should:

- Present a **multi-stakeholder approach** that is the result of comprehensive stakeholder mapping for the given application domain (including game developers, local intermediary organizations and representatives of target audiences showing the local needs and requirements, consultants experts that can bridge these different worlds, facilitate interaction and keep the global learning goal in mind), that clarify how and to what extent each stakeholder will be involved, that demonstrate strong project management (ensuring that an overview is kept and expectations are carefully managed).
- **Have conducted** or propose to conduct a **needs and requirements analysis** of both the intermediary organizations and target user groups that will be involved
- Present an **integrated implementation strategy** that embeds the game in an initiative, in existing practices, structures, and policies (project approach) instead of introducing a game in isolation (a product approach).
- Include a well-researched and financially supported **marketing plan** adapted to the needs and requirements of intermediaries and target groups and the specific contexts in which the initiatives will operate.
- Include a balanced **assessment plan**. It is important to define from the outset clear, assessable targets, both qualitative and quantitative, while being open for unanticipated forms of empowerment.
- Present a **long-term strategy**, considering how they will sustain the initiative (maintenance, support, publishing strategy …) and approach the market after development and initial testing is over (showing understanding of the market potential, indexing the development cost to the marketing opportunity, …)

Recommendation 5: Develop innovative measurements and standards for **impact assessment** for game-based approaches/projects for inclusion and empowerment. Assessment tools are needed for:

- Evaluation in informal, formal and/or non-formal learning contexts
- Consideration of both quantitative and qualitative engagement

Covering a wide array of outcomes, not just build-up basic skill and knowledge components, but also broad conceptual understanding, interaction with peers and those guiding the learning process, identity formation, change in every-day life practices.

6. Glossary of terms

Term	Definition
Assets	Material assets such as housing and thus refer to material goods
Capabilities	Capabilities: Enabling people to increase their well-being by using their assets in different ways
Digital games	Digital games are games produced, distributed and played by means of digital technology. They can be considered as an art and design, technological and research artefact. In the strict sense, a game refers to "a rule-based formal system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels attached to the outcome, and the consequences of the activity are optional and negotiable." (Juul, 2003). In the report, we use the term digital games to refer to games in the strict sense as well as borderline cases in so far as they are relevant to promoting empowerment and inclusion.
Digital games for empowerment and inclusion	1. Special-purpose games (instead of serious games): Games developed for a particular purpose beyond entertainment, in this case, empowerment and inclusion 2. Commercial off-the-shelf games: Games developed for general entertainment, but put to the use of empowerment and inclusion We acknowledge the possibility that meaningful play can emerge from engagement with both types of games. The characteristics of games and their role in participatory culture make them interesting tools for empowerment and inclusion through the learning and participation that they facilitate.
E-inclusion	Entails socio-economic processes shaping access to ICT and related services, awareness of its opportunities and the capability, willingness and confidence to use ICT in every-day life. E-inclusion can refer both to inclusive ICT as well as use of ICT to achieve broader inclusion and empowerment goals. We use the term e-inclusion to refer to (policy-driven) initiatives that attempt to counter social exclusion, promote social inclusion and empower people through digital inclusion.
Empowerment	Empowerment refers to both the community-supported process of (re)gaining control over the resources and decisions that affect one's life, as well as the outcome of this process
Extrinsic motivation	Game play as a means to an end. There are different types of extrinsic motivation that can be situated on a continuum depending on the relative autonomy of the individual. Extrinsic motivation is not necessarily an impoverished form of motivation in which a person only engages in an activity because of external demand. There is also a form that resembles intrinsic motivation, where people choose freely to engage in an activity recognizing its instrumental value.

Formal learning	Learning as an intended and planned activity taking place in an organized context
Game space	"a virtual space in which gamers can join, act and navigate" (Schouten, 2011). Consequently, the ability to connect online in massively multiplayer online role-playing games (MMORPGS) provided an interaction space
Game co-creation	Involving people into a non-trivial component of the design, development, production, marketing and distribution of games
Gamification	Applying game design elements to non-game activities, often with the goal of engaging people more in these activities
Informal learning	Learning without the intention to learn, and without actual planning of learning activities. Sometimes also referred to as experiential or accidental learning
Interaction space	"allowing more meaningful play as gamers are able to communicate, collaborate, decide and co-create" (Schouten, 2011)
Intrinsic motivation	Intrinsic motivation: Game play as a goal in itself; playing the game because one considers it to be an enjoyable, fun activity that is rewarding as such. It is the result of interplay between game characteristics, personal and contextual characteristics. Certain aspects of game play may tend to make this activity interesting for many people, but not necessarily for everyone. It requires that a person's basic needs for competence (i.e. self-efficacy), relatedness and autonomy are satisfied. A person's social context plays an important role in this respect.
Meaningful play	Meaningful play emerges from the interaction between players and a game. It refers to a mutual shaping process, in which the player actively makes sense of the game and this sense-making activity is structured by the game rules, the immediate context in which the game is played and the cultural backdrop.
Non-formal learning	Learning as a result of planned general activities in which participants can learn both intentionally and unintentionally
Persuasive games	Sometimes considered as a sub domain within the broader serious gaming domain, that is, games designed to change attitudes or behaviours of users through persuasion and social influence (Fogg, 2003). Others have used the term persuasive games to refer to games that support the critical interrogation of real-world processes (Bogost, 2007).
Pervasive games	Games that expand beyond traditional temporal, spatial and social conventions of play (see Montola, 2005)
Self-exclusion	Social and/or digital exclusion as a voluntary and conscious strategy
Serious games	"...a mental contest, played with a computer in accordance with specific rules, where entertainment is used to further government or corporate training, education, health, public policy, and strategic communication objectives." (Zyda, 2005, p. 26)
Simulation	A simplified, dynamic, and accurate model of reality (Sauvé et al., 2007)

Social exclusion	Socio-economic processes preventing full participation in society (i.e. production, political, social, consumption and savings activity – Selwyn, 2003) or the outcome of these processes
Social inclusion	Socio-economic processes shaping full participation in society (i.e. production, political, social, consumption and savings activity – Selwyn, 2003) or the outcome of these processes
Virtual world	A synchronous, persistent network of people, represented as avatars, facilitated by networked computers (Bell, 2008)

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Title: State of Play of Digital Games for Empowerment and Inclusion: A Review of the Literature and Empirical Cases

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Abstract
This report presents the 'state of play' of knowledge of how digital games can work as empowerment tools to support social inclusion processes and policy. The report brings together for the first time a review of theoretical and empirical research in a variety of disciplines, especially from learning, social inclusion, e-inclusion and innovation studies to build a framework to help understanding of the potential of games for inclusion and empowerment. It uses this framework to analyse seven well-documented case studies from across the spectrum of digital games for empowerment and inclusion to understand between the factors contributing to their success or failure. It draws conclusions as to the principal challenges, identifies knowledge gaps, and recommends potential action by stakeholders to address these challenges.

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