Central Lancashire Online Knowledge (CLoK)

Title	Skills for creativity in games design
Type	Article
URL	https://clok.uclan.ac.uk/3858/
DOI	https://doi.org/10.1016/j.destud.2010.07.001
Date	2011
Citation	Jeffries, Karl K. (2011) Skills for creativity in games design. Design Studies, 32 (1). pp. 60-85. ISSN 0142-694X
Creators	Jeffries, Karl K.

It is advisable to refer to the publisher's version if you intend to cite from the work.
https://doi.org/10.1016/j.destud.2010.07.001

For information about Research at UCLan please go to http://www.uclan.ac.uk/research/

Skills for Creativity in Games Design

Karl K. Jeffries, School of Art, Design and Performance, University of

Central Lancashire, Victoria Building, Preston, Lancashire PR1 2HE, UK

Corresponding author: kjeffries@uclan.ac.uk

Abstract:

This paper reports on an experimental study to understand further the extent to which academics may differ to practitioners in their conception of skills relevant to creativity within a specific design related subject: in this instance, Games Design. Ten academics, sampled from BA Hons games courses in the UK, participated in identifying what factors they each considered important to creativity in games design, and how, collectively, they rated particular skills, knowledge, talents and abilities relevant to creativity in games design. With the same research methodology, theoretical framework and procedures, the focus was placed on ten games design practitioners' conceptions of skills for creativity in games design. A detailed comparison is made between the findings from both groups.

Key words

Games Design; Creativity; Case Study/Studies; Reflective Practice

In the United Kingdom (UK), the development of the "Creative Industries" has been a constant theme for government policy since 1997 (Crossick, 2006). Numerous reports have been written which espouse its value to the UK economy (DCMS, 2001; HM Treasury, 2005), and many initiatives undertaken to support this sector's growth.

Within such work, much focus has been given to the employability of design graduates for the creative industries: this is seen, for example, in the work of the Design Skills Advisory Panel (2007), specific National Occupational Standards (Skillset, 2003), and the development of Sector Skills Council accredited courses (Skillset, 2005). Given the nature of the creative industries, fostering creative talent remains a significant consideration.

However, whilst the focus on "skills for creativity" is welcome, a number of concerns exist regarding an overly prescriptive interpretation of these skills. Indeed, for some, this is seen as an attempt to standardize curriculums, and is symptomatic of a "mindset" that believes UK Art, Design and Media education to be defective, and unable to meet the needs of employers (Macdonald, 2006).

Clearly, whilst such a debate is complex, two distinct positions can be found: on the one side, those that appear to voice the needs of employers; on the other side, those that appear to voice the needs of educators.

For example, in 2004, the Chief Executive of Skillset (Dinah Caine) highlighted her organization's intention to "…put employers in the driving seat", and, through their Sector Skills Agreements, guarantee that future educational provision in the UK will meet the skills needs of business (Skillset, 2004). More recently, David Braben, the campaign spokesman for Games Up? (a campaign group, sponsored by some of the UK's largest games development studios and trade bodies, to raise the profile of the games industry in Parliament and the media), was quoted as saying "…95% of video gaming degrees are simply not fit for purpose. Without some sort of common standard, like Skillset accreditation, these degrees are a waste of time for all concerned" (Lipsett, 2008).

Yet, in contrast, two years earlier, Professor Geoffrey Crossick, (Warden of Goldsmiths, University of London), in his speech to the Royal Society of Arts, highlighted that it was "…important not to assume that employers automatically know best what education their future employees need", and that a university education should be about "…developing people not just with the skills to meet today's needs but also the conceptual abilities and imagination to take risks that will generate what is needed in the future" (Crossick, 2006).

Alongside this division, a further concern surrounds the quality of research to identify appropriate skills (Macdonald, 2006); a significant criticism suggests the representation of educators in such research studies has not been adequately addressed and, as a result, the research findings are skewed towards industries needs above those of education and learners. It appears that for many academics within Art, Design and Media, greater emphasis being placed on practitioners' opinion of curriculum content (for example, through Sector Skills Council advisory groups) is a significant concern (Wall et al., 2006).

With regard to skills for creativity, however, this concern may, or may not, be valid; such concern, arguably, is largely dependant on the extent to which practitioners' conception of skills for creativity differ to those of academics. Whilst, anecdotally, the higher educational community, and practitioner community, may consider such difference important, quality research findings do not currently exist on which to base such claims.

The aim of this paper is to begin to rectify this deficit. Specifically, through an experimental study, to understand further the extent to which academics may differ to practitioners in their conception of skills relevant to creativity within a specific design related subject: in this instance, games design

Before looking at studies relevant to games design in particular, it is worthwhile to review a few prevalent issues for creativity training and identify skills, both from a theoretical perspective and from the perspective of practical research methodology –appropriate research methodology, which as mentioned previously, can play a key role in the acceptance, or refutation, of findings.

1   Creativity Training, Domain and Subject Specific Skills

Much research on creativity, in recent years, has considered the influence a domain has on a person's creativity (Plucker & Beghetto, 2004), and the extent to which domain relevant skills or subject specific skills impact on creative potential. Indeed, one of the issues highlighted as relevant to the effectiveness of creativity training (Scott, Lyle & Mumford, 2004), appears to be the need to contextualise training content to the specific domain that trainees want to be creative within (games design, film making, architecture, etc.).

The situation becomes more complex when researchers begin to ask, How domain specific does creativity training need to be? Creativity researchers such as Baer (1998) consider training needs to be highly specific such as at the level of short story writing rather than more broadly the domain of creative writing. Though this can be considered to be an extreme stance, and one that not all creativity researchers accept (Plucker & Beghetto, 2004), the question of how specific, or general, is important when researchers or organisations aim to identify, then generalise about, the types of skills to be developed by training aimed at enhancing creativity.

One previous example of this was the work of the Design Skills Advisory Panel. The Design Council in collaboration with Creative & Cultural Skills (the Sector Skills Council for the creative and cultural industries) engaged in consultation over the types of occupational skills domains within the creative and cultural industries would require in the future (Design Council, Creative & Cultural Skills 2006). The intention was that this work would inform government policy on education and training.

However, if Baer's (1998) research findings are correct, the prospect of identifying general domain relevant skills across a whole sector would appear unlikely. Clearly, unlikely does not imply impossible, but it does raise the issue of what evidence is required to confirm the existence of such domain skills; the soundness, and limitations, of the research methodology used will be fundamental to the credibility of the evidence. For example, whilst consensus can exist on domain relevant skills within related occupational domains,

some occupational groupings can show more consensus than others (Jeffries, 2007). One explanation given for this variation in consensus relates to the sampling methods used: some occupational groupings can be too diverse and/or use occupational taxonomies that are too basic for the domains being researched. Such findings highlight that researchers studying domain relevant skills need to carefully consider the sampling procedures they use.

An additional consideration is that participants and group bias needs to be considered and minimised. The influence, for example, of dominant individuals upon a group dynamic can significantly influence the contribution from other group members (Robson, 1993). Such bias, however, can be minimised through the type of research methodology used (Kerr & Tindale, 2004): for instance, by enabling participants to express views in isolation and anonymously prior to the group evaluation of these views.

Finally, consideration needs to be given to the number of domain experts participating in a study. Research, for example, that generalises about domain relevant skills based exclusively on a sample of two domain experts would be problematic; especially given previous studies that use domain judges and consensual methodologies to assess creativity (Amabile, 1982). Established methodologies, like the Consensual Assessment Technique (Plucker, 1999), on average have 7 domain judges per study: this average being based on a sample of 19 published research studies (Amabile, 1996). Other researchers, in extending this technique to less stringent experimental conditions, have used 13 domain judges (Baer, Kaufman & Gentile, 2004). Such studies, moreover, have noted extremely high coefficient alphas (0.957) and suggest that satisfactory inter-rater reliability could be achieved with less than 13 domain judges. Given these findings, the suggestion of between 9 and 11 domain judges per domain appears to be sufficient.

On these three issues (representative sampling, accounting for group dynamics and the number of domain experts taking part) it is useful to compare how previous studies in the UK have dealt with them. The criticism from Macdonald (2006) has been that research, such as that from The Film Skills Group (2003), had no representation from educators or researchers on the steering group. The steering group was made of

25 individuals from a variety of domains, but within this group over a quarter of individuals worked directly for either the Film Council or Skillset.

It is clear from the research methodology section of the final report (Film Skills Group, 2003), that representation from the educational sector was considered: of the 338 people consulted, 60 were classified as belonging to education and training. However, the selection of education providers "on the basis of recommendations from the project steering group, stakeholders and practitioners" (p.21) lends weight to Macdonald's concern of bias. Indeed, given the size, and variety of the educational sector, lack of clarity about exactly how these 60 participants were classified to give a representative sample undermines the research.

Aside from the representation of educators, with regard to the number of domain experts taking part, 338 participants appear more than sufficient. On closer inspection the number of participants varied depending on the sector. For example, eleven film industry sectors were classified for the study, within these only two individuals took part from the commercials sector, and four participants took part from the video sector. Given such low numbers (even within qualitative studies), and on the basis of previous research using consensual methodologies, two participants for a sector is problematic, and likely to skew the findings.

This study, through the control of various research biases, such as appropriate sampling strategies, sufficient participant numbers, participant anonymity, and placing analysis within current theoretical research on creativity, aims to understand further the degree of consensus between academic staff and practicing games designers on skills relevant to creativity within games design. Specifically, the project will consider how conceptions of domain skills may differ for ten full-time games design academics in comparison with ten full-time games design practitioners. Furthermore, this work adds to the discussions surrounding skills acquisition and training within the creative industries (Design Council & Creative and Cultural Skills, 2006, Crossick, 2006), and debates surrounding the role of accreditation (Lipsett, 2008), all of which have, and will continue to have, implications for Higher Education and graduate employability.

2   Method

2.1   Research Design

This study gathered representative samples from two groups, an academic group and a practitioner group, with ten participants per group. The same methodological procedure was used for both groups. After giving their consent, each participant took part in a semi-structured telephone interview to explore what skills, knowledge, talents or abilities were required to be creative as a games designer. Telephone transcriptions were analysed using the Domain Skills Indicator (DSI) methodology (Jeffries, 2007), and participants ranked a list of domain relevant skills related to creativity within games design.

2.2   Academics Participants

The central source of data on Higher Education (HE) is through the Higher Education Statistical Agency (HESA). Few researchers would argue against HESA data representing the most comprehensive and detailed statistical information available on UK academic staff in HE. The HESA data was used to find population parameters of age range and gender for full time academic staff that teach on games courses.

As highlighted in previous research, the degree to which a sample is representative of the target population can be more important than the size of the sample (Burns, 2000). This fundamental point is worth highlighting as such a scenario is likely to occur with the sampling of games academics within UK higher education.

The representation of Batchelor of Arts (BA) relative to Bachelor of Science (BSc) games courses was considered. With a ratio of around one BA course to every three BSc courses (UCAS, 2007), the majority is likely to be drawn from BSc courses if no stratification is attempted; stratification may be important because BA courses tend to be associated with games design and games art, and BSc courses with programming and the more technical aspects of games development.

With such potential distinctions between BA and BSc games courses, in this study, academics were sampled from BA games courses only. This was for a number of reasons.

Firstly, the focus of this study was between academics and practitioners, with the aspiration to compare games designers who work as academics with games designers who work as practitioners. The possibility that BSc games courses may be more associated with games programming had the potential to undermine the research aims for this study. Sampling from BA games courses, in contrast, offered the best option of a like for like comparison.

Games design, historically, is a discipline associated with the game concept and the feel and "play" of the game which culminates in a games design document. Based upon this document, games artists, animators, and programmers fulfill their specific roles in relation to the project. In this respect, the working games designer is, in some ways, analogous to the building architect or film director, and like these, finds him or herself in a leadership position that attempts to resolve the dynamic relationship between their vision and those whose aim it is to implement it (i.e. through the games design document).

Secondly, as discussed previously, given suggestions regarding a sufficient number of domain experts, stratifying the academic sample to reflect the ratio of BA to BSc games courses could be seen to invalidate these research findings. However, choosing to sample only from BA games courses could minimise low consensus levels due to too broad an occupational grouping.

Indeed, even within BA games courses distinction exists; for example, some academic staff may identify themselves as either games designers whilst others, games artists. While this grouping may be appropriately enough related to reflect upon creativity in games design, it is also possible that if consensus is low within this academic sample then grouping games artists with games designers is a probable cause.

Thirdly, with HESA data defining the population for BA games courses in the UK, a study on age, gender and domain identity (games designer or games artist) for all full time academic staff on these courses was able to be undertaken. This allowed some comparison to be made regarding the official HESA population data and gathering more detailed data about full time academic staff teaching on BA games courses.

2.3   Practitioner Participants

The list of games design practitioners came from three sources: Tiga, Gamasutra and ELPSA.

Tiga, describes itself as "the national trade association representing the business and commercial interests of games software developers in the UK and Europe" (Tiga, 2008). The full membership contains large and medium sized Development Studios, with the associate membership made up of Development Studios with ten or less employees. As the Tiga membership also covered companies based outside of the UK, in order to restrict the sampling to the UK, where feasible (using the details available), companies with a European base were deselected from the study.

Gamasutra is an international online community that describes itself as "the leading game development site since 1997" (Think Services Game Group, 2008). It has 396,000 registered members, and can be easily searched for UK based game developers. Within the games design contractors section of the site, two categories were used to select companies for the database: "general games design", and "general visual arts" (comprised of 2D animation, 3D animation, character animation, 3D modeling, illustration/storyboarding, interface design, textures).

ELPSA, the Entertainment & Leisure Software Publishers Association, has nearly 60 companies that reflect most of the major publishers and distributors of interactive leisure and entertainment software in the UK (ELPSA, 2008). The membership contains companies whose main work is not games design but games publishing, games distribution, or other areas related to the games industry: for example, legal services. However, the category "game developer", was added to the database of companies for this research.

After accounting for the repetition of companies across the ELPSA, Tiga and Gamasutra lists, the database of UK companies sampled for this study was one hundred and fifty-four. After randomising the list, 43 companies were contacted, of which just under 25% agreed to take part in the study.

Population parameters (age and gender) of games design practitioners were gathered from two sources: namely, Skillset's (the Sector Skills Council for the audio visual industry) Census 2006 and Workforce Survey 2005. The census data was used to gather the gender parameters (Skillset 2006); the survey data was used to gather the age parameters (Skillset, 2005a). Furthermore, the census data also defined the occupational taxonomy which Skillset used. Other research by Skillset has highlighted the distinction between "the four main disciplines of programming, art and animation, design and management" (Skillset, 2005b, p.4). Equally, as mentioned previously, too broad a sampling strategy may adversely impact levels of group consensus on domain skills. Given much of the debate with creativity research regarding domain specificity (Plucker & Beghetto, 2004), every effort was made to match population parameters to games designers and games artists.

2.4   Procedure

Each participant in this study took part in a semi-structured interview lasting 15 minutes. Transcriptions from each interview were coded into two clusters as defined by the DSI framework: Known Creativity Relevant Processes and Known Creativity Motivational Influences. The remaining information was treated as potential domain relevant skills. After this analysis, a set of cards with a title and description of each domain relevant skill was sent to each participant through the mail. The order of each set of cards was randomized for each participant.

On receipt of these cards, participants were asked to individually select ten cards and prioritize/rank their selections in order of importance to creativity within games design. Each participant's selection was scored as follows: the most important variable was given a score of 10, the next most important a score of 9, etc. Individual scores were then added together to give a collective score for each card. Where scores were tied, priority was given to the number of participants (n) who scored a variable. If a variable was still tied after this, priority was given to the lower Standard Deviation between tied variables.

3   Results for Academics

3.1   Academic Participants

Findings from the study of full time games academics (Jeffries, 2009) highlight that, in relation to the HESA data, cost centre data on academics seems skewed towards much older population parameters than would seem representative of BA games academics on these actual courses. For example, whilst HESA cost centre data suggests 35.1% of the population will be over 51 years of age, this study was only able to identify one full-time academic in this age range out of twenty two. Moreover, cost centre data suggests 14.8% of academics would be between 26 and 35 years of age. However, the study of full time games academics highlights that over a third of the population (36.4%) belongs within this age range. Given these discrepancies in terms of population characteristics, and the fact the HESA data was acquired with the caveats that cost centre (whilst the best means of searching the HESA database for this request) was likely to contain courses other than games courses, the decision was taken to use the data from the study of full time games academics as the basis for stratification of age and gender. Equally, this study suggested that on BA games courses around 54.5% of academics preferred to describe themselves as games artists in contrast to games designers.

The academic group consisted of ten games academics who taught on one or more of the eighteen courses identified in the HESA data. All academics were employed on a full time basis. Within the group, eight were male and two were female. Four participants were within the age range of 26-35, and six within 36-50 years of age, which is representative of the population data for full time games academics mentioned above. The mean age was 37.5 years (SD =6.49 years). Six identified themselves as games designers, and four identified themselves as games artists, which skewed this sample slightly towards games designers. One participant withdrew from the study, and one participant took part in the prioritisation of domain skills only.

3.2   Transcript Analysis

The analysis of interviews showed that, collectively, the academic group suggested eighty-eight variables that they considered important to creativity in games design. Of these variables, ten mapped to Known Creativity Motivational Influences, and twenty-five mapped to Known Creativity Relevant Processes. For example, variables with a theme of "team working skills", or "willingness to work hard" were classified

accordingly. The remaining fifty-three variables showed several areas of repetition between individual academics; after accounting for repetitions, a final list of twenty-seven variables was identified (see Appendix A for titles and descriptions of each variable).

3.3   Prioritisation of Domain Relevant Skills

Complete results of prioritization and selection can be found in Appendix B. The top scoring variable for the Academic participants was titled "Analysis of games" (See table 1). Of a possible maximum score of 90 it received a score of 52 (57.8% of the maximum score); seven of the nine participants in the group selected this variable.

4   Results for Practitioners

4.1   Practitioner Participants

For this study, the most appropriate sector within Skillset population data was computer games and, within this sector, the roles identified in section 10: Interactive or Games Production. Section 10 is further split into three groupings: Creative Development, Technical Development and Project Implementation. Both Games Designer and Games Artist are identified as examples of job titles within Creative Development. In addition, section 10 also contains the job titles of Animator, Environmental Artist, Graphic Designer, Illustrator, Interface Designer, Modeller, Musician, Script Writer, Sound Designer, Sound Engineer and Video Producer. As the gender parameters available encompass all job titles within Interactive or Games Production, it was not possible to consider how well these specifically match those in Creative Development: results suggest 95% of this population are male. Furthermore, with age range, parameter data was only available by sector (Computer Games), and suggested that 12% were within 16 to 24 years, 64% within 25 to 34, 21% within 35 to 49, and 3% were 50 years and over. It was not possible to extract details on the percentage of games designers relative to games artists from the Creative Development grouping.

The practitioner group consisted of ten games design practitioners, whose companies, studios or organisations were randomly selected from the list described above. All practitioners were employed on a full time basis. Within the group, eight were male and two were female. No participants were within the

age range of 16-24, five were between 25-34, five were between 35-49 and none were within the age range of 50 years of age and over. The mean age was 33.6 years (SD = 4.65 years). In relation to the Skillset data mentioned, this sample was skewed slightly towards an older age range and had more female representation than the population data suggested. Nine identified themselves as games designers, and one male participant identified himself as a games artist; but as stated previously, from the data available on the Creative Development grouping it is not possible to show if this is representative or not. All ten participants took part in the telephone interviews; due to work commitments, two were unable to complete the prioritisation of domain skills.

4.2   Transcript Analysis

The analysis of interviews showed that, collectively, the practitioner group suggested one hundred and nine variables important to creativity in games design. Of these variables, sixteen mapped to Known Creativity Motivational Influences, and twenty-eight mapped to Known Creativity Relevant Processes. For example, variables with a theme of "team working skills", or "willingness to work hard" were classified accordingly. The remaining sixty-five variables showed several areas of repetition between individual practitioners; after accounting for repetitions, a final list of twenty-six variables was identified (see Appendix C for titles and descriptions of each variable).

4.3   Prioritisation of Domain Relevant Skills

Complete results of prioritization and selection can be found in Appendix D. The top scoring variable for the practitioner participants was titled "Visualise the game, and player, in your mind" (See table 2). Of a possible maximum score of 80 it received a score of 43 (53.7% of the maximum score); 6 of the 8 participants in the group selected this variable.

5   Discussion

The focus of these studies was to understand further the extent to which academics may differ, or not, to practitioners in their conception of skills relevant to creativity in games design. Given the same research methodology, procedures, and theoretical framework for both studies, comparisons can be made to consider

where themes appear: either common or distinct. Such comparison can be made at a number of levels within each group, and across each group.

Firstly, within each group, the variable identified on each card was sourced from the comments made during the semi-structured telephone interviews. For the majority of domain specific variables, more than one participant raised the same point within their group; this was the case for both the academic group and practitioner group. Individually, academic participants highlighted fifty-three domain specific variables, after accounting for repetitions, a final list of twenty-seven variables were identified (only fifteen of which were unique, i.e. not mentioned by another participant within the group). Some variables, for example: "Jack of all trades, master of one or two", were mentioned by up to five participants. Equally, for the practitioner group, participants highlighted sixty-five domain specific variables; again, after accounting for repetitions, a final list of twenty-six variables were identified (only six of which were unique). Some variables, for example: "Games analysis, and analysis of game mechanics", were mentioned by up to seven participants. Secondly, across each group, comparisons of card descriptions suggested varying levels of commonality between academics and practitioners. The final list of domain specific variables was, in the main, a composite of verbatim transcripts from several interviews.

By comparing variables alongside each other, it is possible to reflect on those that are similar, and dissimilar within each group. Table 3 shows (in no particular ranking) those variables that suggest a degree of similarity. Again it must be noted, that participants from the academic group had no contact with participants from the practitioner group, and went through the same research methodology and procedure. Yet, the descriptions on these cards (see Appendix A and Appendix C) suggest clear parallels around: understanding narrative; being a jack of all trades; having an openness to knowledge outside of games design; playing games; journalistic talent; working creatively within established game play rules; research skills; holding the big vision for the game; a historical knowledge of games design; games analysis; drawing, painting and illustrative skills; level design skills; and being a creative facilitator.

Table 4 shows a number of cards that relate to understanding and respecting the game player. The card labels given on the far left (for academics) and far right (for practitioners) suggest a variety of consideration that support a designer's understanding and empathy with their audience: for example, through knowing how much frustration a player can withstand; how to pace the game for different players; being able to visualise playing the game as the intended audience. Each of these variables reinforces the importance of understanding and respecting individual players and the culture surrounding the gaming market.

A final set of comparisons across each group can be made in how collective scores within each group rank individual variables (table 5). The grey arrows show where a similar variable rated by the academic group has been ranked higher by the practitioner group. Conversely, the black arrows show where a similar variable rated by the academic group has been ranked lower by the practitioner group. Boxes with a grey background highlight the ten variables (mentioned in table 4) related to understanding and respecting the game player.

The first comparison is that both academic and practitioners rate very highly the ability to analyse a game. They also show similarity in how they rate understanding and respecting the game player, and in their regard for having some artistic talent as well as programming talent. Likewise, writing skills and journalistic talent are rated at around the same region. There is less agreement in the way academics rate more highly: playing games, openness to knowledge outside of games design, and understanding narrative/story telling. In contrast, working within game play rules, being a creative facilitator, having the overall vision for the game, and skills in set design/level design are rated more highly by the practitioners.

Dramatic difference in ranking can be seen in the way research skills, knowledge of games, and communication through drawing are rated much more highly by the academics than the practitioners. However, differences in ranking do not mean those ranked lower by one group are unimportant. What these results highlight is that when required to choose from a list of variables already considered important for creativity within games design, some distinction can be made. Indeed, whether these differences in conception are "important" need to be confirmed by experimental studies relating to creative performance.

For the moment it can be argued that academics and practitioners share significant levels of conceptions on creativity in games design.

Returning to the original concerns expressed at the start of this paper, the statement from Games Up? that, "…95% of video gaming degrees are simply not fit for purpose" (Lipsett, 2008), and Crossick's (2006) caution that employers do not "automatically know best what education their future employees need", suggests a divide between the values of educators and those of employers. Yet, on the basis of this research, the results suggest that games design academics' conception of skills for creativity show strong parallels with those of games design practitioners.

Clearly, one study is not enough to make a broad generalisation, but the practitioners appear to also value the conceptual abilities that would support Crossick's view of Higher Education, and, alongside this, academics value the skills that practitioners say they need to be creative. So, if academics share conceptions and values reflected by practitioners, and vice versa, is the notion of a division misinformed? Moreover, the evidence of such differences between educators and employers may well be influenced by who is being researched, and how that research is undertaken. The patterns of voting in this study show that certain members of a group hold particularly strong views that are not reflected in the group as a whole. For example, in the academic group, participant a1 considers "Designing choice into a game" as the most important variable on this list, and "Balancing player frustration and reward" as the next most important variable. Yet, the group as a whole neither selected nor scored either of these choices. Equally, participant a4 scored "Enable social interaction" as the 2nd most important variable, but the other members of the group neither selected nor scored this variable. Similarly, with the practitioner group, participant p6 gives the maximum score possible to "A creative approach to the business side of games design", but no other participants did so. Equally, participant p2 considers "Drawing, painting and illustrative skills" and "Understanding narrative and storytelling" to be highly important, however, no other members of the group selected or scored these variables. In each of these cases, this is not to be taken as a failing; indeed, it may well be what makes them unique, but it does highlight that a focus group methodology could be heavily

skewed if individuals exert their dominance over the group. This lends further weight to Macdonald's criticism (2006) of The Film Skills Group (2003).

In contrast, particular skills only mentioned by one or two participants during the telephone interviews found almost universal support from the group during the prioritisation stage (For practitioners: Visualise the game, and player, in your mind; Find inspiration outside of video games, and Creative facilitator: bring other peoples ideas into the games design process. For academics: Openness to knowledge outside of games design; Research skills, and Playing games). To this extent, this study reaffirms the importance of research methodology, for both collection and analysis of findings

6   Limitations of these Research Findings

As noted previously, the central source of data on HE can be accessed through the Higher Education Statistical Agency (HESA), and is the most comprehensive and detailed statistical information available on UK academic staff. Yet, when dealing at the level of specific population data in relation to academic field (i.e. games design) HESA data does not align itself easily with this type of request. Games design is not a searchable subject via HESA data; it is dispersed over several areas with many other subjects included. Even then it is not possible to guarantee that the staff in these subjects actually teach games design.

Due to the low number of full time BA games academics it was feasible to undertake a small study to confirm, or dispute, the HESA data gathered for this study. As the population size increases, for example, as with BSc games academics, it will no longer be straightforward, or economic, to gather reasonably reliable population data, and, indeed, accounting for sampling error is likely to be a significant consideration.

Thus, in comparison to games design practitioners, gathering basic population data (age, gender and ethnicity) for games design academics is not straightforward. Whilst data can be collected, there appears to

be significant discrepancies in terms of population characteristics (most notably age range) between official sources of data (eg: HESA) and the population data gathered for this study.

A further limitation to this study is that the representation of practitioners is skewed towards slightly older participants than the Skillset data suggests would occur in this population: no participants were within the 16 -24 age range. Equally, the gender for this sample is slightly biased towards female practitioners: two female participants took part, rather than one. However, these discrepancies are slight, and Skillset data (whilst the most comprehensive population data available on the audio visual Industry) could be subject to sampling error. For example, the age ranges used from the 2005 workforce survey are based on a sample of 149 respondents from the computer games sector. It is difficult to accurately estimate the total size of the sector, but 2006 Skillset Census results gathered responses from 8800 respondents who identified themselves as working in Computer Games.

A final limitation to consider is in the introduction of games artists into a study focused on games design. Clearly, with such a small sample on which to base population characteristics, the finding on domain identity, whilst insightful, need to be considered with caution. Greater research needs to be undertaken on such population characteristics, but from this study it appears that the majority of BA games academics identify themselves as games artists. Based on this finding, as mentioned previously, the decision was taken to reflect this in the representation of academic staff.

In each study, participants were asked to reflect upon creativity for games design. The question was the same for both games designers as for games artists. But, this does raise a research design issue: are only games designers allowed to comment on creativity in games design? Is it methodologically acceptable to mix related occupational groups? Again, further research needs to be undertaken on the differences and similarities between games designers and games artists in this respect. For this study, the findings suggest that for BA games academics, such a grouping is appropriate. Had the inclusion of games artists adversely affected the consensus amongst the academic group, then the prioritisation scores would be much lower and the selection of variables would show greater dispersal across the list as a whole. Moreover, as the results

section details, the overall percentage and number of participants selecting the top scoring variables is similar for academics as for practitioners.

7   Conclusion

This paper highlights the results of two experimental studies on skills relevant to creativity within games design. The focus of these studies was to understand further the extent to which academics may differ from practitioners in their conception of skills relevant to creativity in games design

The main conclusions are, firstly, given the same research methodology, procedures, and theoretical framework for both studies, comparisons within each group, and across each group, highlight that games design academics' conception of skills for creativity show strong parallels with those of games design practitioners. Secondly, the voting patterns in these studies show that certain members of a group can hold particularly strong views that are not reflected by the rest of the group. To this extent, these studies reaffirm the importance of research methodology, for both the collection and analysis of findings.

The final conclusion, however, is that although there is some consensus on domain relevant skills amongst games design academics and practitioners, without validation via experimental research in relation to creative performance, caution is required before using these findings to inform educational practice.

References

Amabile, T. M. (1982). Social psychology of creativity: A consensual assessment technique. *Journal of Personality and Social Psychology*, 43, 997-1013.

Amabile, T. M. (1996). *Creativity in context*. Boulder: Westview Press.

Baer, J. (1998). The case for domain specificity of creativity. *Creativity Research Journal*, 11, 173-177.

Baer, J., Kaufman, J. C., & Gentile, C. A. (2004). Extension of the consensual assessment technique to nonparallel creative products. *Creativity Research Journal*, 16, 113-117.

Burns, R. B. (2000). *Introduction to research methods*. 4th Edition. London: Sage Publications

Crossick, G. (2006). *Knowledge transfer without widgets: The challenge of the creative economy*. London: Goldsmiths, University of London.

DCMS. (2001). *Culture and creativity: The next ten years*. London: Department for Culture, Media and Sport.

Design Council, & Creative and Cultural Skills. (2006). Design a new design industry: Design Skills Consultation. Retrieved, accessed March 15, 2010, from http://www.ukdesignskills.com

Design Skills Advisory Panel. (2007). *High-level for higher value*. London: Design Council, & Creative and Cultural Skills.

ELPSA. (2008). *An introduction to ELPSA*. Retrieved August 21, 2008, from http://www.elspa.com

Film Skills Group (2003), *Developing UK Film Talent: A Comprehensive Skills Survey of the UK Film Industry*, London: Skillset/Film Council.

HM Treasury. (2005). *The Economic and Fiscal Strategy Report and the Financial Statement and Budget Report*. HM Treasury, London: The Stationary Office (HM Treasury Publication. No. HC 372).

Jeffries, K. K (2007). Identifying domain relevant skills. In proceedings of the *10th European Conference on Creativity and Innovation*, Oct 14th- Oct 17th, 2007.

Jeffries, K. K (2009). *Skills for Creativity in Games Design (Part 1): Academic Conceptions of Creativity in Games Design*. Higher Education Academy. Brighton: Art, Design and Media subject centre.

Kerr, N. L., & Tindale, R. S. (2004). Group performance and decision making. *Annual Review of Psychology*, 55, 623–55.

Lipsett, A. (2008). Video games degrees: 95% fail to hit skills target. *Guardian,* June 24.

Macdonald, I. W. (2006). Mindset and Skillset; the persistence of division in media education. *Journal of Media Practice*, 7, 135–142.

Plucker, J. A. (1999). Is the proof in the pudding? Reanalyses of Torrance's (1958 to present) longitudinal data. *Creativity Research Journal*, 12, 103-114.

Plucker, J. A., & Beghetto, R. A. (2004). Why creativity is domain general, why it looks domain specific, and why the distinction does not matter. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), *Creativity: From potential to realisation* (pp. 153-167). Washington, DC: American Psychological Association.

Robson, C. (1993). *Real world research: A resource for social scientists and practitioner-researchers*. Oxford, UK: Blackwell Publishers.

Scott, G., Lyle, E.L., & Mumford, D. M. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal*, 16, 361-388.

Skillset. (2003). *National occupational standards: Directors*. London: Skillset (The Sector Skills Council for the Audio Visual Industry)

Skillset. (2004). *Govt spotlight on media employers productivity & skills needs*. London: Skillset (The Sector Skills Council for the Audio Visual Industry)

Skillset. (2005). *Degree course accreditation guidelines for computer games*. London: Skillset (The Sector Skills Council for the Audio Visual Industry)

Skillset. (2005a). *Survey of the Audio Visual Industries' Workforce 2005*. London: Author (The Sector Skills Council for the Audio Visual Industry).

Skillset. (2005b). *Computer Games: Initial Report into the Proposed Accreditation Scheme.* Retrieved , March 15, 2010, from http://www.skillset.org/games/accreditation/article_3700_1.asp

Skillset. (2006). *Employment Census 2006: The results of the sixth census of the audio visual industries*. London: Author (The Sector Skills Council for the Audio Visual Industry).

Tiga. (2008). *What is Tiga?*. Retrieved August 21, 2008, from http://www.tiga.org

Think Services Game Group. (2008). *Gamasutra: The art & business of making games.* Retrieved August 21, 2008, from http://www.tsgamegroup.com

UCAS. (2007). Figures accessed via the "all Game courses" link, *University and Colleges Admission Service*. Retrieved, accessed September 13, 2007, from http://www.ucas.com/

Wall, T., Coley, S., Davies, F., Dubber, A, Harte, D., & Long, P. (2006). Leeds MeCCSA conference. *Three-D*, 7, 13-15.

Table 1: Five highest ranking variables from the academic group

Order	Title	Description
1.	Analysis of games	To be able to de-construct games you need good analytical skills. To be able to break down the good bits and identify weaknesses in what's gone on in past games. To be able to analyse why something works, what's great about it, what makes a great game keep you up till 6 in the morning playing and what makes other games something that you would take back to the shop.
2.	Playing games	To have your own feel for game play you need to play, and have played, a lot of games. However, you need to have a passion for playing games, but not an addiction.
3.	Openness to knowledge outside of games design	Being open to knowledge or cultural experiences outside of games design and game culture. Not being so obsessed with games that you exclude most things that aren't related to games. For example, being well read about Art and Design.
4.	Research skills	The ability to find out and research about areas you may know very little about, or researching to increase your depth of understanding in an area. For example, research the historical context to design a game set in 17th Century.
5.	Working within external constraints	The ability to work within fairly constraining parameters forced on you by other people, i.e. clients, managers, briefs, etc. For example, restrictions placed on you by budget or what resources you have, the type of platform that you have to design for, etc.

Table 2: Five highest ranking variables from the practitioner group

Order	Title	Description
1.	Visualise the game, and player, in your mind	The ability to visualise the game, or versions the game could take, in your mind. The ability to see a game in its finished state in your head. For example, when you are speaking to an artist, they will describe a scene and you can envisage what it is going to be like as a player running down that alley way, or looking out at a vista, etc. Equally, at the same time, you need to be able to take a step back and visualise being a player holding a controller pressing these buttons to get a result, and be able to ask yourself, What is that like? Is that intuitive? Do those buttons infer what I'm getting the player to do on the screen?
2.	Games analysis, and analysis of game mechanics	Be able to look at existing games, and see the things that are good about the game, or where it is has flaws. Then ask why is that flawed? Is it because a particular mechanic is inherently flawed in itself or could it have worked if it had been implemented differently? Understanding how a game is put together so you can dissect it, and pick out the bits that make star games what they are. What makes it feel good and why? To understand, or try to understand, how games work in their particular genre.
3.	Creative facilitator: bring other peoples ideas into the games design process	Be a creative facilitator. For example, a designer has an idea (a racing game with a unique mechanic that's very blurry in their mind); they present it to a group of people because they know this is how they are going to get their final idea. People say lots of different things; the designer facilitates the selections from these ideas, and builds a final idea from these selections. You need to be able to take other people's ideas from the team, take them on board, and be able to give a final call on whether to keep going in a particular direction, or not.
4.	Game play rules	A good grasp of what makes game play interesting. There are learned systems that games, not just computer games but board games and traditional games, all follow. You can look at computer games, and games through the ages, and they all have sets of rules and the majority of these rules haven't changed over many years; it's the implementation of these rules that has changed
5.	The overall vision	Be able to hold the overall vision of the game. As a games designer, you are in charge of the vision of the whole product. This can require keeping the final product as close to the specific idea you've come up with as feasibly possible.

Table 3: Variables that suggest a degree of similarity across the academic and practitioner groups (in no particular ranking)

Academics		Practitioners	
	Understanding narrative & interactive story telling	Understanding narrative and story telling	
	Jack of all trades, master of one or two	Some Artistic talent, some Programming talent	
	Openness to knowledge outside of games design	Find inspiration outside of video games	
	Playing games	Play a lot of games	
	Journalistic talent	Writing skills	
	Working creativity, but within the rules	Game play rules	
	Research skills	Research skills	Attention to detail
Fight your corner (within reason) on game play	Hold the big vision	The overall vision	
	Knowledge of games	Historical knowledge of games design	Be flexible with game genres, etc.
Analysis of platform	Analysis of games	Games analysis, and analysis of game mechanics	
	Communication through Drawing	Drawing, painting and Illustrative skills	Using artistic skills to sell your ideas
Level Design	Level Design software	Set design/level design	
The ability to handover	Spend time listening to other involved in making games	Creative facilitator: bring other peoples ideas into the games design process	Stay on top of varied information

Table 4: Grouping of cards relate to understanding and respecting the game player.

Academics		Practitioners	
Be able to create novel interactivity	**Understanding your intended audience** The ability to understand the market you are designing for. Whether designing for a mature core audience, or putting together a design for children, you need to be able to understand the psychology and social mechanics behind a particular demographic. To be able to understand what their needs are; what their expectations are; what they find attractive; what they find distasteful; what will challenge them, what cues they will need to solve a problem. You need to do all this in a manner that doesn't talk down to them in anyway, and genuinely understand that what you like isn't what everybody else likes.	**Respect for the player; empathy with the market** Not giving them the same old stuff, because it has worked before. Not accepting a shallow stereotypical view of your audience, but understanding and respecting who you are designing for, having empathy for the people you are making it for. Being able to put a new take on an existing fan base by finding something new within the genre of that game.	Pacing games mechanics to the audience
Designing choice into a game			Visualise the game, and player, in your mind
Balancing player frustration and reward			Market knowledge
Enable social interaction			Wrapping the game mechanics

Table 5: Comparison between academic group rankings and practitioner group rankings

Rank	Title (academics)
1	Analysis of games
2	Playing games
3	Openness to knowledge outside of games design
4	Research skills
5	Working within external constraints
6	(see table 3) Understanding your intended audience
7	Jack of all trades, master of one or two
8	Knowledge of games
9	Communication through drawing
10	Spend time listening to other involved in making games
11	Hold the big vision
12	Journalistic talent
13	Be able to create novel interactivity
14	Working creativity, but within the rules
15	Analysis of platform
16	Designing choice into a game
17	Understanding narrative & interactive story telling
18	Enable social interaction
19	Balancing player frustration and reward
20	Fight your corner (within reason) on game play
21	The ability to handover
	Seeing oneself as games designer more than a games player
	Level design software
	Technical feasibility
	Level design
	The quality of feeling at home in your working environment
	3D Studio Max

(practitioners) Title	Rank
Visualise the game, and player, in your mind	1
Games analysis, and analysis of game mechanics	2
Creative facilitator: bring other peoples ideas into the games…	3
Game play rules	4
The overall vision	5
Respect for the player; empathy with the market (see table 3)	6
Find inspiration outside of video games	7
Some artistic talent, some programming talent	8
Play a lot of games	9
Writing skills	10
Pacing games mechanics to the audience	11
Attention to detail	12
Stay on top of varied information	13
Market knowledge	14
Be flexible with game genres, etc.	15
Research skills	16
A creative approach to the business side of games design	17
Set design/level design	18
Drawing, painting and illustrative skills	19
Understanding narrative and story telling	20
Using artistic skills to sell your ideas	21
Anticipate the games market	22
Historical knowledge of games design	23
Wrapping the game mechanics	
Photo editing	
Hand eye co-ordination	

Appendix A: Final list of twenty-seven variables, with titles and descriptions (alphabetically arranged by title)

Title	Description
Analysis of games	To be able to de-construct games you need good analytical skills. To be able to break down the good bits and identify weaknesses in what's gone on in past games. To be able to analyse why something works, what's great about it, what makes a great game keep you up till 6 in the morning playing and what makes other games something that you would take back to the shop.
Analysis of Platform	To be able to analyse the platform you are designing for. For instance, with a specific platform you need to know what is good and what is limited about a platform. Furthermore, how these qualities both good and bad, can impact on game play, and the game overall.
Balancing player frustration and reward	You have to frustrate the player to a point, but you have to give them incentive: you have to give them a reason to play, reward them in some manner.
Be able to create novel interactivity	Being able to examine interface options in terms of generating novel interaction. Being able to sustain and create fantastic new environments keeping the visual language new but at the same time allowing players to quickly understand the visual language you have created.
Communication through Drawing	The skill to convey design ideas through drawing: diagrams, doodles, freehand sketches, artwork, etc. For example, a quick sketch of a character can sometimes help you create a whole game idea. Drawing as a way to convey the game idea or character, but it doesn't necessarily have to be a very good drawing. The drawing is a means to pass on the initial concept to another person for them to develop, i.e. a games artist. Visually communicating the idea is most important, the ability to really convey the idea, in an immediate way, through visuals.
Designing choice into a game	Games are often about choices, but the choices available are designed ones. For example, if a player makes choice A, what's the benefit of this over choice B.? However, as a designer you want to avoid making choice B a worst choice than A, or you don't really give the player a choice anymore. There is a balance and skill needed in designing choice in games.
Enable social interaction	Be able to understand how to really enable social interaction. For example: be able to abstract down interactions between real and invented characters, and, at the same time, not break the illusion by emphasizing the specialty of the characters, or bring attention to the fact that certain characters might be artificial.
Fight your corner (within reason) on game play	Be able to fight your corner against problems presented by artists, programmers, other designers, senior management, etc. Often design work can get driven by art and code and it's easy to get dragged into simulation instead of using art and code to create better game play. It's hard, but often as a games designer you need to fight your corner on game play. But at the same time be realistic, or prepared to be reasoned with.
Hold the big vision	The games designer needs to hold the big vision of the whole game. Being able to hold the big vision is ultimately about the ability to flesh out the initial idea. For example, the style of the game: how is this going to be portrayed visually; is it going to be 3D; is it going to be 2D; is it going to be 3D pretending to be 2D; is it going to look like it's hand drawn; will it look like it's painted in oils, etc? The games designer is a key person within the whole games development pipeline who keeps the big vision in mind.
Jack of all trades, master of one or two	Many disciplines feed into games design: a broad knowledge of each discipline is better than a single detailed knowledge and experience of one area. However, you probably need to show talent in a particular disciplinary route, for example: narrative building/script writing/story telling, visualization/game art, programming/technology, level design, marketing/rival studios, testing. The designers' role is moving more towards what in film terms would be a director. Someone who understand the limitations that members of their team/crew are going to come up against.
Journalistic talent	The ability to get your ideas across very clearly, concisely, and precisely, in a written format. For example, through the Game Design document, or to do justice using a few sentences to a game idea -especially if the novelty of the game has no precedent.
Knowledge of games	Knowing what has happened previously, and is currently happening, with games and games design. To have an encyclopedic knowledge of games, for example, can help to categorize your work, channel it and contextualise it. Knowledge of games includes not only commercial products but the latest debates and research on games and games design.
Level Design	Understanding how a player will flow through a level.

Level Design software	The ability to use level design software with reasonably proficiently. For example, using a level editor to communicate your design ideas to other members of the team.
Openness to knowledge outside of games design	Being open to knowledge or cultural experiences outside of games design and game culture. Not being so obsessed with games that you exclude most things that aren't related to games. For example, being well read about art and design.
Playing games	To have your own feel for game play you need to play, and have played, a lot of games. However, you need to have a passion for playing games, but not an addiction.
Research skills	The ability to find out and research about areas you may know very little about, or researching to increase your depth of understanding in an area. For example, research the historical context to design a game set in 17th Century.
Seeing oneself as games designer more than a games player	Having more of a focus on making games rather than playing them.
Spend time listening to other involved in making games	For example: being able to listen to the coders; listen to the artists; you have to understand the budget, which means you have to listen to the publishers; in general you have to listen to your team because sometimes the best ideas aren't the designer's own ideas.
Technical feasibility	To know what is feasible in a certain timescales, budget, or with particular resources.
The ability to handover	The ability to handover your work to a team and let go, rather than hold on to it as your "baby".
The quality of feeling at home in your working environment	To feel comfortable to create. For example, some people like working in just a small room with nothing on the walls, other like lots of things and people around them: what is appropriate varies from person to person
Understanding narrative & interactive story telling	An understanding of established theory around narrative and story telling: characterization, story plots, themes, tones, etc. Looking at narrative both within and outside of games design, for example, in film, literature, performance theatre, music, etc.
Understanding your intended audience	The ability to understand the market you are designing for. Whether designing for a mature core audience, or putting together a design for children, you need to be able to understand the psychology and social mechanics behind a particular demographic. To be able to understand what their needs are; what their expectations are; what they find attractive; what they find distasteful; what will challenge them, what cues they will need to solve a problem. You need to do all this in a manner that doesn't talk down to them in anyway, and genuinely understand that what you like isn't what everybody else likes.
Working creativity, but within the rules	The ability to create fun and creative challenges out of the rules of the game.
Working within external constraints	The ability to work within fairly constraining parameters forced on you by others people, i.e. clients, managers, briefs, etc. For example, restrictions placed on you by budget or what resources you have, the type of platform that you have to design for, etc.
3D Studio Max	A basic knowledge of how to use 3D Max. For example, to create a level map.

Appendix B: Voting patterns of academic participants

Title	Academic Participants									Total
	a1	a2	a3	a4	a5	a6	a7	a8	a9	
Analysis of games	*	*	*		*	*	*		*	52
Playing games	*	*		*	*	*	*	*		51
Openness to knowledge outside of games design	*		*	*	*	*	*	*	*	47
Research skills		*		*	*	*	*	*	*	35
Working within external constraints	*	*	*	*		*	*	*	*	34
Understanding your intended audience	*	*	*		*		*		*	31
Jack of all trades, master of one or two		*			*	*		*		29
Knowledge of games		*	*	*	*	*				28
Communication through Drawing					*		*	*	*	25
Spend time listening to other involved in making games	*	*	*			*			*	24
Hold the big vision		*			*	*	*			24
Journalistic talent		*	*	*		*	*	*		18
Be able to create novel interactivity			*	*				*		17
Working creativity, but within the rules	*		*							15
Analysis of platform			*	*						11
Designing choice into a game	*									10
Understanding narrative & interactive story telling				*	*			*		9
Enable social interaction				*						9
Balancing player frustration and reward	*									9
Fight your corner (within reason) on game play	*				*		*			8
The ability to handover								*		6
Seeing oneself as games designer more than a games player										0
Level design software										0
Technical feasibility										0
Level design										0
The quality of feeling at home in your working environment										0
3D Studio Max										0

Appendix C: Final list of twenty-six variables, with titles and descriptions (alphabetically arranged by title)

Title	Description
A creative approach to the business side of games design	To have a business element which can see new opportunities, make links with the right people/companies, and who can go out and sell new ideas, as and when they occur, to the right people, which then brings in the money to develop them.
Anticipate the games market	The ability to anticipate where the market is going to go, and anticipate what sort of new things can be achieved with certain evolving technologies. What is creative today will not be next year and sometimes it is possible to anticipate and lead the games market.
Attention to detail	The ability to use your research to discover, for example, a bit about the atmosphere, the costumes for the characters, the background scenes and gaming environment, etc. Being able to have this attention to detail can really bring the game to life, whether the genre is real or fantasy based.
Be flexible with game genres, etc.	The ability to mould yourself into any particular style, genre or engine, and come up with the goods as a games designer.
Creative facilitator: bring other peoples ideas into the games design process	Be a creative facilitator. For example, a designer has an idea (a racing game with a unique mechanic that's very blurry in their mind); they present it to a group of people because they know this is how they are going to get their final idea. People say lots of different things; the designer facilitates the selections from these ideas, and builds a final idea from these selections. You need to be able to take other people's ideas from the team, take them on board, and be able to give a final call on whether to keep going in a particular direction, or not.
Drawing, painting and illustrative skills	To be skilled in drawing, painting and other skills associated with illustration and illustrators. For example, to have a good understanding of line, composition, light and shade. All these are fundamental qualities about design which will inform what you do, for example, with designing a character, a movement, but also with generates ideas in general, and for some designers this can help them with story building.
Find inspiration outside of video games	One of the problems with the games industry is that you'll play games and you can see things have been drawn directly from another game. Whilst it's okay to take inspiration from video games, you have to make sure you don't overstep the line between inspiration and (in the worst cases) pure plagiarism. One antidote is not to just use other video games as inspiration; instead, watch movies, go to the theatre, read stories, play games outside of video games, play table top games, play board games, etc. You do this so you have a huge pool of reference materials to draw inspiration from to make something new.
Game play rules	A good grasp of what makes game play interesting. There are learned systems that games, not just computer games but board games and traditional games, all follow. You can look at computer games, and games through the ages, and they all have sets of rules and the majority of these rules haven't changed over many years; it's the implementation of these rules that has changed
Games analysis, and analysis of game mechanics	Be able to look at existing games, and see the things that are good about the game, or where it is has flaws. Then ask why is that flawed? Is it because a particular mechanic is inherently flawed in itself or could it have worked if it had been implemented differently? Understanding how a game is put together so you can dissect it, and pick out the bits that make star games what they are. What makes it feel good and why? To understand, or try to understand, how games work in their particular genre.
Hand eye co-ordination	Very talented games players sometimes can be very good designers. They have very good hand/eye co-ordination, and often have been able to achieve more in games because of this, which can give then a huge depth of gaming experience on which to draw from when coming up with their own game design ideas.
Historical knowledge of games design	To have extensive historical knowledge about the gaming industry. For example, there are a lot of established game player patterns from the 70's that we still use today, so you need to have an extensive knowledge of the gaming industry and what's come before. Know about games that have already been produced: the ideas, the stories and the game play features.
Market knowledge	Knowledge about the current gaming market. For example, people are currently thinking about casual games, browser based games, etc. Market knowledge allows you to tailor your designs to your audience demographic: the people you are designing a particular game for. You need to know what people are currently attempting to do and what is being worked on at the moment. You need to understand the industry, what we are up to, what the latest game patterns are, and the latest technologies.
Pacing games mechanics to the audience	An understanding of how to pace mechanics, etc. to appeal to the different demographics playing your game, i.e. the range between new subscribers, to

	hard core gamers. For example: players learn rules in one game, and they often take the rules they have learnt there onto the next game. There is a skill in knowing how much you can rely on that being the case and how much your game has to be able to stand alone because it still needs to appeal to people who have never played a game before.
Photo editing	The skills required to edit photography digitally, and other forms of digital image enhancement
Play a lot of games	To have played, and play, a lot of games yourself. For example, you need to play every kind of game; you need to understand the different genres. Get new titles or going back to past things, looking at different genres: not just playing what you are familiar with. There's a certain feel and experience a person picks up from just always playing games. You've got to play a whole range of different types of games, not just the really good games, but games that you know have flaws.
Research skills	The ability to research about games. For example, if you're producing a specific style of game then be able to look for games that have similar styles, similar kinds of stories, etc. Have the ability to research old ideas for previous games, or able to research the market you are designing for, or find sources to develop your game concept. For example, being able to use the web to outsource materials for your games, or being able to collect imagery that can be used to build details into the game environment.
Respect for the player; empathy with the market	Not giving them the same old stuff, because it has worked before. Not accepting a shallow stereotypical view of your audience, but understanding and respecting who you are designing for, having empathy for the people you are making it for. Being able to put a new take on an existing fan base by finding something new within the genre of that game.
Set design/level design	To be skilled in set design, and how to create a plausible landscape from very limited means. To an extent games level design is trying to great an illusion similar to theatrical set design. For example, you are asking how I can get as few objects in there as possible to give it the illusion I want.
Some artistic talent, some programming talent	Some artistic talent and some programming talent are useful. For example, not to the extent of a professional artist, who needs to make artwork all the time, but to the extent that you can understand what an artist is telling you when they are explaining something about their job. The same point applies for programming, and the code side of things.
Stay on top of varied information	A games designer has to think of the story, the environment, the characters and the interactions, the game play features, the user interface, the menu system, the credits, etc. It involves a lot of information to stay on top, and you need to have the ability to stay on top of varied information.
The overall vision	Be able to hold the overall vision of the game. As a games designer, you are in charge of the vision of the whole product. This can require keeping the final product as close to the specific idea you've come up with as feasibly possible.
Understanding narrative and story telling	To understand a little bit about how stories work, understanding narrative and story telling. For example, reading stories, watching films and talking about books films etc., can aid with being able to talk about characters: how they interact, to understand the social situation the characters are placed within. This type of story telling knowledge can be very relevant to the sort of the contemporary games that are trying to make the game experience play as a film.
Using artistic skills to sell your ideas	Artistic skills can help get your ideas across. For example, 12 paragraphs on a page is probably going to turn most people off so you need to get the idea across with a succinct sentence, an image, the way you do a flow chart, etc. The more artistically you can sell an idea, pitch an idea, or just tell an idea, the more you're likely to get a much better response than something that's very dry.
Visualise the game, and player, in your mind	The ability to visualise the game, or versions the game could take, in your mind. The ability to see a game in its finished state in your head. For example, when you are speaking to an artist, they will describe a scene and you can envisage what it is going to be like as a player running down that alley way, or looking out at a vista, etc. Equally, at the same time, you need to be able to take a step back and visualise being a player holding a controller pressing these buttons to get a result, and be able to ask yourself, What is that like? Is that intuitive? Do those buttons infer what I'm getting the player to do on the screen?
Wrapping the game mechanics	The ability to make the wrapping match the rules that you have set up in your mechanics. For example, with the trend towards realism for some games (i.e. realistic wrapping), the mechanics that underlie it generally have to match that realism, but when suddenly something happens the way it doesn't happen in the real world it jars. With those sort of games your need to avoid this jarring effect.
Writing skills	The ability to clearly write down your ideas for others to understand, for example, through a games design document, scripting for games, background stories, pitches, etc. The ability here is to communicate your ideas in a format that fits the conventions of the industry.

Appendix D: Voting patterns of practitioner participants

Title	Practitioner Participants								Total
	p1	p2	p3	p4	p5	p6	p7	p8	
Visualise the game, and player, in your mind	*	*	*	*	*		*		43
Games analysis, and analysis of game mechanics			*	*	*	*	*	*	39
Creative facilitator: bring other peoples ideas into the games…		*	*	*	*			*	36
Game play rules	*			*		*	*	*	33
The overall vision	*	*		*	*		*		32
Respect for the player; empathy with the market	*	*				*		*	28
Find inspiration outside of video games	*	*	*	*	*		*	*	27
Some artistic talent, some programming talent					*	*	*	*	24
Play a lot of games			*	*	*	*	*	*	21
Writing skills			*	*			*	*	21
Pacing games mechanics to the audience	*					*		*	20
Attention to detail	*		*		*	*		*	19
Stay on top of varied information			*		*				16
Market knowledge	*			*		*	*		15
Be flexible with game genres, etc.		*	*						14
Research skills	*		*		*				10
A creative approach to the business side of games design						*			10
Set design/level design						*	*		8
Drawing, painting and illustrative skills		*							8
Understanding narrative and story telling		*							7
Using artistic skills to sell your ideas	*			*					6
Anticipate the games market		*							2
Historical knowledge of games design		*							1
Wrapping the game mechanics									0
Photo editing									0
Hand eye co-ordination									0