Playful Learning

Louis Rice: University of the West of England, UK

Abstract

This paper explores the use of playful learning as an approach to teaching and learning. The research used the playful aspects of the 'dérive' (an approach to understanding an environment developed by the Situationists group) as a vehicle to examine this approach. Learning through play is well documented for children and although less researched for adults there are clear pedagogic aims: play is seen an important process that can aid learning in a variety of ways. This paper explores the potential of playful learning, using semi-structured questionnaires and a focus group in a School of Planning and Architecture. The research presents findings that playful learning can be effective in motivating and improving student engagement, promoting creative thinking towards learning and developing approaches towards multi-disciplinary learning. There was also evidence that a playful approach towards learning and knowledge can facilitate ontological change within students. The research recommends that this approach can be relevant and helpful to students in creative and collaborative working environments.

Keywords: Active Learning, Architecture, Urban Design, Pedagogy

Introduction

Playful approaches for learning and education are well understood and used in learning environments for children but are less common in higher education institutions (Piaget, 1999; Papert, 1980). The benefits to learning and teaching through play for adults are clear and various, particularly in creative and design related fields. My interest in this approach to learning has developed from my use of a variety of learning styles with students in the Department of Architecture, particularly a form of playful learning that is widely used in UK Architecture Schools – the dérive. Anecdotal feedback from students learning through play tended to relate to a transformation of the students' perception and knowledge. This piece of research attempts to understand these approaches to learning in a more systematic and rigorous manner, and also to situate playful learning objectives within educational and learning theory.

The research question this paper aimed to examine was "what is the role of playful learning approaches for students in an architecture school?" It had three main objectives:

- to explore the concept of playful learning for adults in existing literature;
- to situate the dérive within theories and practices of education;
- to undertake primary research on the outcomes of playful methods on learning experiences using semi-structured questionnaires and a focus group.

The paper is organised into the following sections: literature review; methodology for the research; findings and analysis; and conclusions.

Literature Review

Learning through play is a widely explored approach to learning and teaching and has been much used for children's learning. Research into playful learning approaches relating to adults is more limited, although there are some key themes that are relevant to adult learning (Sutton-Smith, 1997). Defining play or playful behaviour is difficult to do as it contains many transient, contradictory and context dependent qualities. Often play is defined more in relation to its opposite – serious work (Goodale and Godbey, 1988). Play often involves the breaking or blurring of boundaries, so that work and play can become the same activity (Huizinga, 2000). Bakhtin (1984, pp. 4-5) proposes that the process of learning requires both of these conditions, which include the "official" hegemony and "nonofficial" knowledge, and are often carnivalesque or playful activities. Chazan (2002, p. 19) suggests: "Play occupies a realm outside of everyday events. It has to do with imaginings and trial action. Anything is possible." All of these definitions and others provide multiple perspectives on the possible fields of meaning that play can encompass, Henricks (1999, p. 258) summarises that play has "a contradictory, even paradoxical character". Despite this panoply of definitions of what play might be, there are some broad qualities that define adult play for this research project (summarised from Henricks, 1999):

- play is an experience;
- it has intrinsic rather than extrinsic motives;

- the process is more important than the outcome;
- it involves some level of active engagement.

The definitions of what play might be are very broad, but the qualities of playful activities listed above are close to many aspects of good practice in learning theory and practice (Cannon and Newble, 2000). The question of why learn through play, or why play whilst learning, are addressed in the following sections.

The benefits of play are seen as developing or promoting creativity, imagination and spontaneous learning (Lieberman, 1977). These creative skills require a variety of approaches to allow students to explore issues from a variety of perspectives, and playful methods in particular encourage and enable alternative views to be produced.

Learning through play requires the process or experience to be fun, which can increase student engagement. A variety of approaches can help with students' motivation and engagement (Cannon and Newble, 2000). Playful methods can be incorporated into a wider range of approaches to learning styles. VARK (Visual, Aural, Read/Write and Kinaesthetic) learning styles are an effective way of structuring the teaching to enable students to learn in a variety of ways (Fleming and Mills, 1992). The use of play mostly allows kinaesthetic styles to be adopted, although play can also be adapted within the other VARK approaches.

There are several examples of learning through play for adults at Higher Education Institutions. The use of LEGO (*Mindstorms Robotic Invention System*) is perhaps the most well known and widely used (Enkenberg, 2001). Also the use of digital gaming environments is increasingly used to improve virtual learning methods (Ruben, 1999; Nemerow, 1996; Papert, 2000). Csikszentmihalyi (1990) proposes that when students are involved in play, specifically when they are 'carried away' with what they are doing, referred to as flow, is when much deep learning is occurring.

Playful approaches in education sit within a constructivist theory of learning. Constructivism is centred on the concept that individuals construct their own perspective of the world based on their interpretation of their personal experiences (Gagnon and Collay, 2006). Ramsden (1992, p. 110) proposes learning as a "conception of reality" – the way individual students translate learning for themselves and construct their own conception of knowledge. The students' perspective of the world changes in response to additional experiences, new information and reflection (Baxter Magolda, 1999). This view is echoed by Biggs who summarises elements of constructivist theory to propose that: "meaning is not imposed or transmitted by direct instruction, but it is created by the students learning activities, their approaches to learning" (Biggs, 1999, p. 13). The shift from learning as direct transmission to a constructive process requires that there is no single or universal truth, but that there are many alternative versions of events. Often this learning requires a change in the student - an ontological change, which is a profound and often difficult process for students. Play within this process is helpful in that it literally plays with students' preconceived ideas and concepts, requiring them to develop their own perspective, and understand the multiplicity of alternative views. Meyer and Land (2006) describe that this process of learning is also a process of loss, in that by gaining a new insight on the world, one must change oneself, and hence lose part

of one's old self. Thus constructivist learning causes and sometimes requires an ontological transformation of the student in a process of transformative learning (Crook and McCulloch 2008). Constructivism requires students to be challenged and engage with difficult knowledge at times to enable the transformation of knowledge for each student, and this in turn requires alternative approaches to didactic teaching. Playful approaches to learning are one of the ways in which that can be achieved, playing with notions, conventions or breaking habits and habitual behaviour.

Play can be a stimulating approach to adult learning, encouraging knowledge to be constructed whilst also encouraging creativity and imagination (Lieberman, 1977). Henricks (1999) described some of the qualities of play and perhaps the key one is that of active engagement in an experience, which is part of a process referred to as '*experiential learning*'. Experiential learning is learning from actually performing something rather than abstractly learning about it (Boud *et al.*, 1985). Practical experience enables students to interact with phenomena directly rather than abstract concepts. Rieber (2001, p. 4) proposes that:

a simple way of understanding serious play in education is with the advice of 'experience first, explain later'. A teacher who follows this advice looks for ways to engage learners in some meaningful experience as early on as possible

Experiential learning can also be understood as a cyclical system rather than a linear process (Kolb and Fry, 1975, p. 33). Although playful activities can cover a vast range of possibilities, this research paper uses an approach that does require some physical engagement and experiential learning through the dérive (explained later). The dérive is carried out in its first stage as a concrete experience for the students (a), which is followed by observations and reflections on their dérive (b) and then from experience and reflection this developed into abstract concept and generalisations (c), and then test out these concepts in new situations (d). The important element of this model is that it is a circular process and that it requires critical reflection on the experience for learning to develop.

Lastly, critical reflection is an important part of the praxis of education and construction of knowledge. The role of reflective practice in education is for students to arrive at the truth for themselves through activity followed by reasoning – sensation and then reflection. Bolton (2005, p. 1) describes that reflective practice "lays open to question anything that is taken for granted". Playful approaches in education may require activity and sensation, but experience alone is not sufficient for learning always to be achieved, there must be some critical reflection to turn the experience into learning. The process of critical reflection is inherent in Kolb's experiential learning cycle:

The most appropriate methods of teaching and learning...seem to be those which are concerned with enquiry, analysis, experience and problem solving. The paradigm of 'good practice' is further sustained by the new approaches to adult/higher education...and the cycle of reflective professional practice.

(Bines & Watson, 1992, p. 61)

Thus the critical reflection is part of the cycle of learning and requires at each stage to encourage the learner to locate themselves within this process.

Play can be a powerful learning process for adults in higher education, and is embedded in a constructivist theory of learning, and requires experience and reflection as part of that process. For this research project, the dérive – a playful method of investigating a site, was used as the vehicle for exploring this theme; the following section explains and explores the dérive.

The Dérive

The dérive is a method of site analysis and appraisal, created by the Situationists in 1954 and was developed further over the following two decades. The Situationists were interested in art, politics, architecture and film and their work and theory has had a profound influence in the way that we understand cities (Ford, 2005, p. 33). This paper defines what the dérive is, based on a review of Situationist literature to draw out the key themes (and claims) of the dérive, and then contextualises these claims in educational theory, in particular how they relate to playful education for adult learners.

Existing literature provides no systematic grounding of the dérive within educational theory, despite the dérive being relatively well practised in many of the UK architectural schools. This paper is therefore partly to provide an educational context for the dérive in relation to play.

What is a dérive? "one goes along in any direction and recounts what one sees" (Lefebvre, 1983, p. 280). Lefebvre summarises the origins of the dérive in this statement, a method of investigating a site without the use of specific, prescribed outcomes or data searching. It is a method of exploring the city from new perspectives, specifically to discover ones that had previously been ignored, taboo or censored. The Situationists refer to these qualities of a site as psychogeography as "that which manifests the geographical environment's direct emotional effects" (Andreotti and Costa, 1996, p. 69). These could be the: undercurrents, ambience, traces, smell, temperature, threats, activities, routes, routines and rituals, and the effects that these have on the emotions and behaviour of individuals. Students rarely explore these psychogeographical qualities of a site, and in undertaking a dérive are required to suspend their quotidian work, and enter into an approach to exploring the city as play or a game. A key figure of the Situationist movement was Guy Debord who described the dérive as: "A mode of experimental behaviour linked to the conditions of urban society: a technique of transient passage through varied ambiences" (Debord, 1958, p. 51).

This 'transient passage' is where the dériver sets out on a journey with the intention of drifting from place to place with no predetermined idea of where they will go, or what they will find or experience. The exploration is in contrast to our normal movement through the city in which we mainly travel purposefully between work and leisure activities. The key element to the dérive is the incorporation of play into its methodology. Debord proposes that the dérive should include "playful constructive behaviour" as an inherent part of the process (Andreotti and Costa, 1996, p. 22). The deliberate use of play partly reflects the influence of the Surrealists on the Situationists, who also developed many games as part of their techniques (Ford, 2005). Playful devices to encourage a pattern of free exploration during a dérive could be following a direction based on the roll of a dice, or carrying a toy windmill and following

the direction of the breeze, or dropping a ball and heading wherever it bounces. Merrifield (2005, p. 28) proposed that the Situationists attempted to inject "imagination and play in social life and urban culture" as a means of making cities and its inhabitants more playful. The inclusion of play should be both part of the *practice* and an *outcome* of the dérive, and is partly why it was chosen as the vehicle for exploring playful learning for this research project. The dérive breaks the boundary of expected behavioural norms related to 'worklike' methods for students and replaces them with playful methods. The element of play with work is ambiguous territory for the investigator.

The Situationists required direct action and experience to be the basis of the dérive (Ford, 2005). The practical process involved was central to their practice and knowledge generation. The dependence on experience to gain insights on psychogeography is in contrast to an abstract process of investigation. The dérive is phenomenological in its connection to knowledge from experience (McDonough, 2004).

The dérive was the primary tool by the Situationists for playfully exploring the city. The literature on the dérive can be divided into these educational themes:

- Personal: to understand space and cities from a personal space with oneself in it.
- Experience: physical action and phenomenological investigation involving all of the senses to explore and communicate with one's surroundings.
- Celebrate the ignored: to open up one's experience to other parts of the city that will only be ignored by the purposeful routes that we normally take in the city (psychogeography).
- Play: to engage in challenging ideas that prompt critical thinking within an experiential atmosphere of play.

The dérive is a playful approach to learning, and has been used by a wide range of students in a number of Architecture Schools and also by cultural geographers' and creative arts. This project used a sample of those students who undertook a dérive, and reports back on their experience of playful learning within a higher education institution.

Methodology

The research strategy was designed to explore the research question and objectives and sought to develop appropriate methods of investigation. The main areas to investigate were: understanding the educational theory behind playful learning; examine the dérive as an appropriate activity for playful learning; implement a playful method within the educational process of architecture students; and finally reflecting on that from both the position of teacher and learner.

Each student was asked to undertake a dérive in the inner city areas of Bristol. Students were tasked to explore or discover the psychogeography of their chosen site. They each constructed the 'rules' to their own game. This included the use of a playful device and the rules for using this device for exploring the site. The dérive process required them to set about exploring the city as a kind of educational game. The students were taken from two

groups within the architecture school: the first, a third year group of 52 students, and the second, 18 post-graduate students. The choice of students was pragmatically arranged according to design-studio modules. There was an almost equal mix of male to female students and although many of the students were relatively young there were some mature students.

Applying Robson's (1993) three types of research: experimental, survey and case study, this research project primarily used the case study strategy, which involved an empirical investigation. The project also combined survey work within the case study, utilising both qualitative and quantitative methods. The research process is partly recursive and uses inductive and deductive research processes which follow the research strategy proposed by Rudestam and Newton (1992, p. 5) and was repeated twice over two semesters with different student cohorts in an attempt to develop and improve the research. The data was collected and then analysed to elucidate findings, and these were evaluated to produce conclusions and some recommendations to feedback into the conceptual framework.

The project began with my hunch or proposition about playful learning approaches which grew from my own experiences of using the dérive. This hypothesis was then examined by setting the task of a dérive for a group of students. Initially the study adopted a deductive research strategy. It collected data from existing literature related to the main concepts, and attempted to look for patterns and create generalisations to answer the 'what' questions. Data was coded and collected from this first iteration from semi-structured questionnaires administered to the students after the dérive (a total of 25 students out of the 52 completed the questionnaire). A semi-structured questionnaire was deemed a suitable approach as it provided the students "with a medium for the anonymous expression of beliefs" (May, 2001, p. 97) which was important in this context, as the topic being investigated was felt to be personal and potentially emotive to students (the results from the questionnaires have been made anonymous and are referred to by the prefix AP, e.g. AP03). The student responses were used to develop the theory further and inform the conceptual framework.

The second iteration of the research process examined the concept of playful learning within existing educational and learning theory, whilst also using the findings from the first attempt to refine the process. The literature pointed to a series of key qualities for playful learning. These were relatively broad and concerned a wide range of different educational objectives and learning contexts: themes from literature were: play as transformative learning, play stimulating creativity and imagination, play as spontaneous learning and learning through play as a fun activity. The research project limited the possible outcomes to those found within the School of Architecture and used an experiential approach to frame the research and structure the question further. The aim for data collection was to adopt a systematic and rigorous approach towards the collection of data (David and Sutton, 2004). The primary data was gathered, organised and analysed in an inductive process to re-inform the conceptual framework. The data collected during the second iteration was from a focus group of five students from a total of eighteen, and are referred to with the prefix UD. The focus group was loosely structured on the responses developed from the earlier questionnaires. The focus

group allowed further investigation and clarity behind the reasoning of the responses within the questionnaire. The focus group was set up to achieve a number of objectives:

- to obtain an array of perspectives on the playful approach;
- to focus discussion on the issues raised from the literature review;
- to gauge the range of feeling towards the use of playful methods.

These objectives became the starting point for the topics covered during the focus group. The focus group allowed the interaction within the group to bring out different issues to the individual responses. Focus groups "can be particularly useful in attitudinal research: explaining or accounting for attitudes is sometimes easier for people when they hear different attitudes" (Ritchie and Lewis, 2003, p. 59). The concept of playful learning was relatively new to the students, and the focus group allowed the students to respond and react to each other's comments.

The limited sample sizes combined with the use of one playful approach 'the dérive' also limits the wider generalisability of the findings. The dérive was a 'case-study' approach to investigating this research question. However it is clear that there are many other playful approaches to learning and it is possible that different outcomes could have occurred with differing approaches. A common criticism or limitation of the case-study method is that the dependence on one case limits wider generalisability of conclusions (Yin, 2003; Robson, 1993). Another limitation of the methods adopted for this research strategy was the size of the sample population (Blaikie, 2005). Normally, the larger the sample size the higher the reliability, this project only had small samples due to time and resource constraints, and so there are implications about the wider applicability of the work with such small samples. However Yin (1993) claims that generalisation of results is made to theory rather than necessarily to populations, also size can be less significant than appropriate selection methods (David and Sutton, 2004). The further generalisability of these results for other student cohorts is a matter of judgement, dependent on many factors; the limited sample size, plus varying course content and learning context.

Ethical Considerations

The key ethical issue for this research was ensuring the confidentiality of the students, and so following ethical considerations; all information was kept confidential and anonymous, and the students informed of this beforehand; the questionnaire was not compulsory for any student to complete. There were some conflicts in this process, as students were asked to respond to material from the researcher, who would also be assessing their modules. This conflict could not be avoided in the timescales available and so should be considered during the data analysis process.

Findings and Results

This section will present the findings from the research project based on the literature review, questionnaires and focus group. The qualities of play investigated involved an approach which was physical, actively engaging and had a clear playful element. The findings relate to this definition, but it is clear there are many other possible definitions and uses of play than

are covered here. The results presented here are from both the questionnaires and the focus group. The combination of data from the questionnaires and focus group have been organised according to the key educational and learning themes identified in the earlier sections. The questionnaire included some closed-ended questions that required Likert scale responses from 'strongly disagree' through to 'strongly agree'. At the end of the questionnaire there were semi-structured questions, which provided space for students to respond holistically on their experience of the dérive. Although the results are not statistically significant with such a small sample group, they give some indication of the value of play, and provide the basis for further investigation.

The majority of students in both groups found the process playful, 85% of the questionnaire respondents agreed 'strongly or very strongly' that the dérive was playful. The inclusion of a playful approach sometimes elicited positive responses "having to mix up play and work was really challenging, but eventually it made me see things differently" (UD03). AP13 "enjoyed playfulness" whilst studying and another thought "the dérive was great fun" (UD05). Many connected play with the creative process; "playing around with ideas" (AP02) and "allowed my imagination to roam" (AP11). Another theme that came out was also a heightened awareness of the sensory qualities of the site. Students used words such as "smells, sounds and aura" (AP07) and "textures" (AP12) which were not qualities they had previously sought or observed. A connection to the sensory qualities is part of experiential learning for students of architecture which is difficult to 'teach' in a classroom.

The most profound outcome of practising the dérive was an ontological change in the student. Although this was a minority of students, there was consistency in the responses amongst these students. "It opened my eyes to a whole new way of seeing the city" (UD01) and "it made me think much more deeply" (AP12). Students also mention that the process "heightens awareness to place" (AP04) and "alter my perception" (sic) (AP09) and that they now "perceived it in a completely different way" (AP19). These transformative moments relate back to Meyer and Land's (2006) concept of learning as an affective process and not simply a cognitive one. The learning process required the students to radically or fundamentally alter their preconceptions (in this case of cites and environment); UD01 described it as "enlightening". Whilst this change in knowledge is a reflection of much deep learning, it is also difficult for learners too. Meyer and Land (2006) referred to the feeling of loss, and students also connected this to an emotional context of learning. Student (AP15) reported feeling "scared and uncomfortable" and others commented on the sometimes difficult emotional content (AP09, AP15, AP06, AP04, UD02). Most of the students (68%) agreed and/or strongly agreed that "they see the city differently after the dérive" and that the dérive altered their understanding "compared to traditional survey methods" (72%).

In an open question at the end of the questionnaire, students were asked to write down what they disliked about the dérive. Some students found the inclusion of play within an academic setting more difficult, "it took me a while to relax into it" (UD01) and "playing was difficult because I kept thinking I am going to be marked on this" (UD04) and UD02 commented that "I felt scared at times which stopped me from playing". The location of the dérive was partly to blame; it was a deprived, run-down and rather scary part of the city. One of the requisites

about playful behaviour is that the person feels safe or comfortable in their surroundings, and this is an important element in the successful implementation of playful approaches. These approaches are contingent upon many elements for their success: the student cohort, the educational environment and the subject studied.

Students generally agreed that playful learning was a positive element within the learning process. Some found it useful on a pragmatic level; "can break up the monotony of academic procedures" (UD01) "abates the usual boredom" (AP11) or "provides a mini-break from the traditional ways of learning e.g. lectures" (UD04). These comments align with the processes described by Cannon and Newble (2000) as ways of varying learning approaches to improve student engagement, concentration and motivation. Play can be successful as an approach to learning, although it needs to be part of a wider vocabulary of approaches, and used appropriately for certain subject areas. This concurs with Schön (1983, p. 138) who argues that new problems are dealt with by a "repertoire of examples, images, understanding, and actions". The use of playful behaviour was useful in contextualising the learning in a site's socio-emotional environment (i.e. psychogeography): 84% of students agreed or strongly agreed "that it helped their understanding of psychogeography". The deliberate blurring of play and work enabled students to become aware of their relationship to the emerging knowledge. Although many of these themes are explicit, others are covert or include tacit knowledge and these could be made more explicit. Playing also required the students to consider the construction of their experience and the challenge of confronting the difficult territory of play within an assessed piece of work.

Personal Reflection

One of the aims of the primary research was to reflect on the playful learning from both the position of teacher and learner. The playful aspects of the project have been used by many students outside of this study. The dérive has become incorporated as an approach to knowledge gathering by students that cuts across modules. Through longitudinal contact with students, it has been found that this approach has 'legitimised' alternative views of data and knowledge to be appropriated for a subject. For some students, the dérive has permeated beyond the confines of academia and become part of their everyday practice. For example, students have self-directed their own dérive during field trips abroad as a mode of experiencing that city. The dérive has also become a 'metaphor' for intellectual processes that mimic the physical dérive, students have developed mind-games using the playful devices to map concepts and ideas. The playful aspects that made learning fun encouraged its incorporation into other learning landscapes.

Conclusion

Playful approaches to learning can be an effective mode of teaching and learning. The inclusion of play helped to generate excitement, enjoyment and interest as part of the process of learning. It can be understood as part of the VARK learning approaches, which help with motivation, engagement, and allowing different learners to approach a subject from different perspectives.

L. Rice: Playful Learning

Playing with knowledge, themes and topics required students to challenge existing hegemonic views, which in turn required further evaluation and assessment of knowledge, data and epistemology. The results pointed toward a student's approach to learning that is generated by the student's activity, rather than directed by the teacher. This shifted the role of learning from a passive mode towards an active process for the students. In undertaking a dérive, students were required to consider for themselves what they were looking for, and what could be 'found', rather than simply trying to get the right answer. The nature of knowledge and the institutions that shape that knowledge were also investigated through the use of playful modes of enquiry. In some cases there was evidence of ontological change in the student resulting from playful approaches to knowledge and learning.

In playing with ideas and knowledge, the process of construction of knowledge can be facilitated, and can be used to develop students as reflective practitioners. In some instances the process transformed the students (or rather the students transformed themselves using this approach) and resulted in an ontological shift for some students.

Play was successful in generating an atmosphere of creativity and imagination. As students felt that *'normal'* behaviour and practice was suspended, they could explore ideas more freely and play with concepts, boundaries and disciplines. The culture of play was closely related to the language used within design, of playing with ideas, playing with the rules and role-playing. The use of games or play can enable individuals or small groups to generate many ideas in a free and spontaneous way, which is very important in establishing a culture of creativity among a student cohort.

The use of play transformed the act of learning from an institutionalised process towards a practice of the everyday. Playful modes of learning transcend the realm of academia and are transplanted into the 'outside' world. Ideas and concepts become hybridised between theory and practice through the use of play.

Lastly students were more confident with exploring knowledge from multiple perspectives which increased with iterations of playful experiences. Learners were encouraged to explore their notion of knowledge, and through this were required to 'discover' their own data, requiring them to grapple with what can be measured and/or quantified. There were risks in using this approach, for students, they sometimes felt they 'got it wrong' and for the teachers there was an impression of a risk of failure in implementing these approaches amidst 'serious work'. There is significant institutional pressure on teachers to justify their approaches, to be able to measure and assess them, and for this process to be audited. Attempting to incorporate playful approaches into this modularised institution can be difficult. Playful learning requires a shift from the concept of students as passive consumers of knowledge towards active creators of knowledge. This can be difficult for teachers and students operating within a modular system based on a pass/fail system. Students are caught in a paradoxical situation where they are encouraged to learn for themselves yet must also fulfil the module requirements. Nonetheless, playful learning can enrich and augment existing approaches to learning for students in higher education.

Critiquing the Research Process

There were clear playful elements as part of the dérive which students had to undertake, however there are many other ways in which playful approaches to learning could and are used and incorporated within higher education. This research took place in a relatively creative University institution with students from a variety of backgrounds and skills, and whilst the results are applicable to other creative disciplines, it is not clear how it relates to non-creative disciplines. The research did not attempt to examine these approaches within other institutions or disciplines, although these findings will help to enable a comparison between disciplines.

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