

Comparing student and faculty perceptions on the instructional value of iPads in art and design education

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Abstract

This paper compares the perceptions of art and design students and faculty of the instructional value of iPads. More specifically, this paper draws from the main conclusions of two previous studies to compare the views of the two stakeholders, using as a framework of comparison the Rieber and Welliver (1995) five-step hierarchical model of technology adoption. Briefly, in the two previous studies both students and faculty were given the freedom to use iPads for teaching and learning, but without a specific task to guide their use. This bottom-up approach was deliberate, and together with the characteristics of art and design education and in particular the dominant modes of teaching and learning, provide the delimitations of the earlier studies. When comparing – in this paper – the outcomes of the previous two studies we noted that the adoption pattern was restricted mostly to the first two stages of the Rieber and Welliver (1995) model, familiarisation and utilization, with some effort from faculty to integrate iPads in curricula. We argue that integration, reorientation and evolution – the latter stages of the model - require change that can only be achieved if all stakeholders share in the process.

Keywords

art and design education, students, faculty, iPads, models of technology adoption

1. Introduction

In 2012, the authors of this paper, representing the research lab Networked Learning Technologies in Art and Design (NLTAD) at Cyprus University of Technology, and academic colleagues from Falmouth University, embarked on a long-term empirical study on the use of iPads in art and design Higher Education (HE). During the first stage of this task the authors investigated the perceptions of and experiences of undergraduate art and design students with regards to the instructional potential of the iPad (Souleles, Savva, Watters, Bull & Annesley, 2014). During the second stage they examined the attitude of art and design faculty towards this tablet computer. The purpose of this paper is to provide a comparison with the perceptions and outcomes from the two previous stages, based on the Rieber and Welliver 1995) model of technology adoption

The authors referred to readings about the models of implementing instructional technology in educational institutions and organizations in general. The latter is examined as a starting point for this paper. This is followed by a description of the main characteristics of teaching and learning in art and design, because the pedagogical context inevitably and largely underpins and informs the attitudes

of all stakeholders. Then follows a description of outcomes from the first and second stages (students and faculty) of the original study. The concluding part of this paper provides a comparison and synthesis of the perceptions of students and faculty of the instructional value of iPads in art and design.

2. Models of technology adoption

There is a lack of empirical studies on how to adopt instructional technologies in HE that combine the views of different stakeholders, for example academics and learners. The same applies on how to embed new technologies in art and design education. Even though this indicates potential lacunae, it is acknowledged that it is difficult to develop a formula on how to combine the different and often conflicting perspectives of all stakeholders. Context-specific challenges make such scenarios ideal for participatory action research (Grundy, 1982). There is, however, some literature that compares the views of stakeholders on instructional technologies to highlight areas of potential difference or to compare views (See for example: Hsu & Chang, 2009; Li, 2007). These are mostly case studies that allow for little or no transferability of outcomes and lessons learnt.

Al-Senaidi, Lin and Poirot (2009, pp. 576-577) provide a useful summary of the three most influential and prominent theoretical models for the adoption of Information and Communication Technologies (ICTs). Firstly, the authors present the Technology Acceptance Model (TAM) that explains the behavioural intention of a user's computer usage. This model considers subjective factors such as beliefs, attitudes, perceived usefulness and perceived ease of use. Secondly, the authors elaborate on Rogers' diffusion theory, which suggests that the diffusion of an innovation is a process driven by early innovators, followed by the early adopters, the early majority, the late majority, and lastly the laggards. Briefly, this theory argues that the rate of technology adoption is relative to the speed with which people adopt an innovation over time. According to Al-Senaidi et al. (2009) the third most influential model is that developed by Rieber and Welliver (1995), who propose a five-step process for technology adoption at post-secondary level (Table 1).

Evolution	
Reorientation	↑
Integration	↑
Utilisation	↑
Familiarisation	↑

Table 1: The Rieber and Welliver (1995) five-step hierarchical model of technology adoption

The first step of this model covers familiarization and entails a baseline exposure to new technology. At this level teachers may consider the relevance of the technology for teaching and learning, but often the technology is rejected. The next stage of the same model consists of utilization, and this involves the teachers using the technology once or twice. Teachers may have some ideas about the usefulness of the technology and can perceive some relevance for teaching and learning, but if the technology malfunctions, they tend to abandon it. Alternatively, they may use the technology for minor tasks, such as record keeping, but do not attempt to integrate it into the curricula. Utilization is followed by integration, i.e. the start of use of the technology for instruction. At this stage, teachers make a choice about the appropriate way that the technology can be used for teaching and learning. Should the technology be removed, teachers would have difficulties in reworking their lessons to accommodate alternative options.

The stage of integration marks the beginning of appropriate uses in delivering and developing instruction. Teachers at this level do not use the technology for the sake of using it, but rather have made a choice about instructional delivery that is most appropriately handled by the technology. Should the latter be taken away at this point, teachers at the integration phase would have a hard time reworking their lessons to accommodate an alternative option. In the reorientation stage, the teacher uses the technology as a tool to facilitate the reconsideration of the purpose and function of teaching and learning. Finally, at the evolution stage, teachers are able to continually modify instruction to include evolving learning theory, and lessons learned from the teaching and learning experience.

In conclusion, the TAM approach elaborates on attitudes that inform individual technology use. Rogers' diffusion theory focuses mainly on the relative speed with which members of an organization adopt an innovation (Al-Senaidi et. al, 2009, p. 576). For this paper we selected the Rieber and Welliver (1995) model as a framework for the synthesis of student and faculty perceptions about the instructional value of the iPad, because it provides a framework developed specifically for post-secondary education, and the different stages it entails allow for the mapping and comparison of the views of the two groups of stakeholders (students and faculty).

3. The art and design context

Art and design education encompasses a number of overlapping disciplines with increasingly blurred boundaries (Kennedy & Welch, 2008). It is characteristic of these disciplines that they are considered to be of low paradigmatic development. In other words, there is little agreement among the members of the related disciplines about theory, methods and techniques. In contrast, disciplines such as biology, chemistry, physics and the sciences represent disciplines of high paradigmatic development (Braxton, Olsen & Simmons, 1999, p. 301). Due to the open-ended nature of most art and design outcomes, the curriculum tends to be fluid (Shreeve, Sims & Trowler, 2010, p.135). Subsequently, teaching and learning practices emphasise the development of a broad set of intellectual skills and competencies, which the Art and Design Subject Benchmark Statement lists as '...intellectual maturity, curiosity,

personal innovation, risk-taking, independent enquiry, and effective management and planning skills' (Kennedy et. al, 2008, p. 9).

Another characteristic is that the instructional approaches that take place in art and design disciplines often entail the setting of a conceptual problem, regular lectures, informal presentations of student work under development, and a series of critiques of student outcomes also known as 'crits'. It is common practice that a group of academics undertakes the final assessment of completed student outcomes (Ellmers, 2005, p. 2; Cennamo, Brandt, Scott, Douglas, McGrath, Reimer & Vernon, 2011, p. 14). The teaching and learning practices in art and design tend to be student-focused rather than teacher-centred. The focus of overall instruction is project-based learning, whose instructional aim is to replicate as much as possible contextualised design problems in real life settings (Ellmers, 2005, p. 5).

Lastly, learning in art and design has a visible dimension. Outcomes manifest as artefacts that are open to debate and examination. Learners increasingly learn to incorporate critical feedback and to work with a decreasing amount of support and feedback. In addition, learning is primarily social, that is teaching and learning practices are visible and discussed often in an informal manner and in the presence of peers. Process and development are of significance because they support the ongoing exploration and refinement of outputs. Therefore, assessment focuses on process as well as the finished artefact.

4. Research methodology and design for stages one and two

For the first two stages of the research task, the authors pursued a phenomenographic approach. Despite the critiques of qualitative approaches in relation to the objectivity of the researcher, the reliability and transferability of outcomes, and the lack of predictive power, all of which are inevitable consequences of the anti-positivist paradigm, phenomenography provided the opportunity to investigate attitudes towards the iPad from a broad perspective (Souleles, 2012). This research approach was considered suitable to capture the variation of perspectives and views among all stakeholders. Some phenomenographic studies (Pang, 2003) focus not only on what the different ways are of experiencing a phenomenon, but also on what is a way of experiencing a phenomenon. The former is referred to as the 'referential' aspect (what) of the variations of perception, and the latter as the 'structural' (how). The fundamental assumption of phenomenography is the existence of a finite number of qualitatively different ways of perceiving a particular phenomenon, in our case to illuminate the variations in ways which students and faculty consider the instructional potential of iPads in undergraduate art and design disciplines.

All the answers from students and faculty were mapped on the Rieber and Welliver (1995) five-step model of technology adoption. Although this model was developed to gauge the attitude of teachers towards adoption, we used it to also map the student perceptions of the instructional value of iPads.

For the first stage of the study, participating students came from both institutions, but first and final year students were excluded. In the case of the former, it was considered that they did not have sufficient time to adapt to the teaching and learning culture of the related disciplines. Equally, students undertaking their final year of study were also excluded because it was considered that they may not have sufficient time to engage in a meaningful manner with the research project. Thus the population comprised a non-probability, purposive sample, and this implies a potential risk of bias in comparison to probability sampling.

Each student was handed an iPad and a stylus, with a number of pre-installed free applications (apps). These comprised four categories: utilities, social networking, productivity and creativity, and were selected by the authors of this paper based on their perceived value. The students were not provided with instructions on how to use the tablet. This was deliberate, because the focus of the investigation was to capture – through open-ended interviews - a bottom-up appraisal of the value of iPads from the perspective of undergraduate students in studio-based disciplines.

During the second stage of the project thirty-two faculty members from both institutions participated. These faculty members teach in various undergraduate programmes in art and design and in different years of study. Some of the subjects they teach involve more practical (hands on) teaching and learning tasks, for example Fine Arts, Printmaking and Drawing, while others such as Semiotic Theory and Creative Writing are of a theoretical nature. There was an effort to balance the sex of participating faculty (17 male, 15 female), although this was not possible due to the voluntary nature of the project. Thus, the gender of participating faculty comprises a sample of convenience. It needs to be noted that although the literature on how female users engage with tablets is not extensive, studies indicate some differences. Male users tend to be early adopters and use tablets for a wider range of activities (Snyder Bulik, 2011, p. 12).

Each participating faculty member was handed an iPad and a stylus, with the pre-installed software (apps) limited to the default factory settings. However, faculty members were allowed to download their own apps without restriction. Lastly, participants were not provided with instructions on how to use their iPad; this was deliberate, because the focus of the investigation was to capture their unhindered perceptions of the value of iPads for teaching and learning based on the use of the tablets over a period of one academic semester. Data were gathered through open-ended questions that were developed to elicit answers about effort expectancy, performance expectancy, social influence, and facilitating conditions.

5. Mapping on the Rieber and Welliver (1995) model

In stage one the following questions were asked of participating students: a) Based on your experience in using the iPad for one semester, how did you find it for your studies? b) In your opinion, in what kind of situations do you think the iPad can be useful for learning? c) In terms of usability, how did you find the iPad? d) In your opinion, how does the iPad compare with a laptop? e) What is your opinion about the apps that were installed on the iPad? The replies to these questions, depending

on where they fit in terms of the answers given during the interviews, were mapped on the Rieber and Welliver (1995) five-step hierarchical model (Table 2). The right fit of statements vis-à-vis where they fit exactly in the model, is not always obvious, and the authors judged the category allocated on the Rieber and Welliver (1995) model from the overall impression and general meaning developed from reading each individual interview transcript.

Questions	1. Familiarisation	2. Utilisation
Based on your experience in using the iPad for one semester, how did you find it for your studies?	<ul style="list-style-type: none"> • Preference for tactile learning experiences (as opposed to using an iPad). 	<ul style="list-style-type: none"> • Varied ways to support learning. • Focus on uses and limitations.
In your opinion, in what kind of situations do you think the iPad can be useful for learning?	<ul style="list-style-type: none"> • Unable to describe any learning use. 	<ul style="list-style-type: none"> • Described more than three uses. • Described more than two uses.
In terms of usability, how did you find the iPad?	<ul style="list-style-type: none"> • Perceived as difficult to use. 	<ul style="list-style-type: none"> • Perceived as easy to use.
In your opinion, how does the iPad compare with a laptop?	<ul style="list-style-type: none"> • Identified uses and limitations for each device. • Perceived superiority of the laptop based on processing power. 	<ul style="list-style-type: none"> • Emphasis on speed of access and interface of the iPad. • Combined use of both iPad and laptop. • Described different uses for each device.
What is your opinion about the apps that were installed on the iPad?	<ul style="list-style-type: none"> • Some apps useful and some not. • Not easy to learn apps and not enough time to explore. • Apps were not useful. 	<ul style="list-style-type: none"> • Range of apps useful for different tasks. • Selective choice of apps for learning. • Many apps share similar features.

Table 2: Mapping student perceptions on the Rieber and Welliver (1995) model of technology adoption

In stage two the following questions were asked of participating faculty: a) Do you think that the iPad can influence the academic performance of students? b) How easy do you consider it is to use the iPad for teaching and learning? c) Would influence from peers and/or students affect your decision to use the iPad for teaching and learning? d) Do you consider that you have access to the right institutional infrastructure to support your use of the iPad for teaching and learning? The replies to these questions, depending where they fit in terms of the answers given during the interviews, were mapped on the Rieber and Welliver (1995) five-step hierarchical model (Table 3). As with table 2 (above), the right fit of statements is not always obvious, and the authors judged the category allocated on the Rieber and Welliver (1995) model from the overall impression and general meaning developed from reading each individual interview transcript.

Questions	1. Familiarisation	2. Utilisation	3. Integration
Do you think that the iPad can influence the academic performance of students?	<ul style="list-style-type: none"> • Expressed doubts whether the iPad can influence teaching and learning 	<ul style="list-style-type: none"> • Emphasised the significance of good instruction versus distracting potential 	<ul style="list-style-type: none"> • Identified practical ways to facilitate learning
How easy do you consider it is to use the iPad for teaching and learning?		<ul style="list-style-type: none"> • Effortless completion of certain instructional tasks • Some tasks require more effort than others • Time-consuming to properly complete task 	
Would influence from peers and/or students affect your decision to use the iPad for teaching and learning?		<ul style="list-style-type: none"> • Peer and student views matter • Preference for own experience with the technology 	

Do you consider that you have access to the right institutional infrastructure to support your use of the iPad for teaching and learning?

- Emphasis on good IT support and wireless Internet
 - Lack of sufficient technological infrastructure
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Table 3: Mapping faculty perceptions on the Rieber and Welliver (1995) model of technology adoption

6. Analysis and conclusion

The characteristics of the art and design teaching and learning milieu, as described above, underlines and informs to a large extent the approach of the two stakeholders (students and faculty) towards the instructional potential of iPads. These characteristics need to be considered as the delimitations of the two previous studies (stages one and two) that inform this paper, and in particular the fact that in both stages participants deliberately were not given specific learning tasks to accomplish, and there was no clearly defined instructional context to use the iPads.

When comparing the two tables above (Tables 2 and 3) that map student and faculty perceptions on the Rieber and Welliver (1995) model of technology adoption, we note that the majority of perceptions held by both stakeholders on the instructional value of iPads, fall within the categories of familiarization and utilization. More specifically, at the level of familiarization both students and faculty considered the relevance of iPads for teaching and learning. When rejecting the tablet, they used arguments in support of tactile (non-digital) learning experiences, they were unable to describe any potential use of teaching and learning, they perceived the tablet as difficult to use, they identified limitations and in some cases considered that a laptop is more useful. At the level of utilization there were some attempts to incorporate the iPads in teaching and learning (capturing data, presenting work and developing visual draft ideas and concepts), and some usefulness was identified for certain apps. However, only at the level of the faculty was there an attempt to integrate in a more systemic way the use of iPads in teaching and learning. This is to be expected, as faculty are the ones that determine how curricula are delivered and although students may identify some uses, in the end the former are responsible for curricula.

In conclusion, when comparing student and faculty perceptions of the instructional value of iPads in art and design education, and within the delimitations of the research methodologies, we note that the next stages of the Rieber and Welliver (1995) five-step hierarchical model of technology adoption require a more complex stance and possibly a campus-wide approach. The effective integration of iPads in the curricula, the reorientation and reconsideration of the purpose and function

of teaching and learning due to the opportunities provided by iPads, and finally the evolution stage that implies continuous action research to learn from the related teaching and learning experiences, all these require change that can only be achieved if all stakeholders share in the process (See for example the paper in these proceedings: iPads at the University of Western Sydney (UWS): Initiating institutional transformation, by Lynnae Rankine, Dennis Macnamara). Otherwise, the adoption level of the different stakeholders will remain out of sync and piecemeal.

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