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Designing Wireframes as Assessment in the Study of Adolescent Mental Health

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Applications (apps) have become commonplace in the treatment of adolescent mental health problems. This study set out to explore whether it is possible to prepare undergraduate counselling students to use these professional tools, as part of an assessment regime. Using the software "Pencil Project" students enrolled in an undergraduate counselling degree were required to design wireframes for an app to support adolescent mental wellbeing. Evaluation methodology employing a concurrent quan-qual mixed method was used. Marks earned for student presentations of their wireframes, along with marker comments were analysed followed by a thematic analysis of student reflections of their learning experience. Students reported that this authentic learning approach to counselling constructs was innovative and positive. This positive engagement was reflected in student grades where all students earned a 'pass' or better and their reflections revealed the experience to be transformative. By sharing lessons learned this paper contributes to the literature in innovations in technology enhanced learning. While further iterations are required, it is hoped that this study provides the groundwork for those interested in pursuing the design of wireframes as a method to measure students' application of knowledge.

Introduction

Students in higher education are more likely to see the value of developing digital skills if they believe that the skills are important to their careers (*JISC*, 2015), and as such, educators need to ensure that graduates are aware of the digital developments in their field and the challenges and benefits of using them. There is also strong evidence that technology offers students greater choice, and authentic and relevant learning opportunities (*JISC*, 2011). *Technology Enhanced Learning* (*TEL*) is increasingly common in higher education as a way to engage students in learning, while simultaneously developing their digital literacies. Students learn by doing rather than about Information and Communication Technology (Handal, 2016). However, Kirkwood and Price (2014, p. 6) in their critical review of *Technology Enhanced Learning (TEL),* argued that while the term "is used to describe the application of information and communication technologies to teaching and learning," the benefit is not always evident, and most educators do not use technology to engage in innovative student-centred learning opportunities. Driven by a desire to provide students with an alternate task to the longstanding essay and to increase students' digital literacies in the Bachelor of Counselling course, second year teaching staff set out to investigate whether a technology focused cumulative assessment task could support student engagement and lead to deep and sustained applications of adolescent counselling theory. Specifically, by drawing on the ubiquitous nature of mobile phones in

young people's lives and their use in counselling, students were required to evaluate currently available *apps,* and then to design their own. Given the deficiency in theory-based *apps*, the focus of the task was for students to defend their *app* theoretically, and in doing so meet the learning outcomes briefly outlined as: apply different concepts; theories, strategies and communication skills in working with adolescent clients; and identify ethical and legal issues.

Literature Review

Given the proliferation of mobile phones in the lives of Australian adolescents, it is not surprising that *apps* are used for a range of purposes including well-being. In 2013, there were approximately 3000 *apps* targeting assessment, diagnosis, and intervention for mental health issues (Donker, Petrie, Proudfoot, Clarke, Birch, & Christensen, 2013) and studies have found *apps* are useful tools in targeting unhelpful cognitions and problematic behaviors (BinDhim, Shaman, Trevena, Basyouni, Pont, & Alhawassi, 2015; Crutchfield, Mason, Chambers, Wills, & Mason, 2015; Coyle, Doherty, Matthews, & Sharry, 2007; Eysenbach, Fleming, Chacón, Stallard, Porter, & Grist, 2016; Warren, 2012; Watts, Mackenzie, Thomas, Griskaitis, Mewton, Williams, & Andrews,2013). In Australia, 89% of adolescents have a mobile phone (Macpherson, 2013), and 65% have downloaded an *app* to their smartphone (*ACMA*, 2014). Such high penetration allows health practitioners to communicate with adolescents where *apps* represent an adjunctive tool. However, in order to be of benefit, *apps* need to be theory driven (Bohleber, Crameri, Eich-Stierli, Telesko, & von Wyl, 2016), acknowledging the unique experiences of adolescents (Rafla, Carson, & DeJong, 2014; Quelly, Norris, & DiPietro, 2016; Whittaker et al., 2012, cited in Kenny, Dooley, & Fitzgerald, 2016). Unfortunately, there are no consistent certification processes for *apps* (Leigh & Flatt, 2015), and evidence of unpinning theory is scant (Parmar, & Sharma, 2016).

Albeit limited, the research describing *app* development can be categorised as belonging to one of three groups of assessment. The first is where students without prior mobile *app* programming experience were tasked with designing and developing an *app*. In this example Yamamoto, Kimura, Takahashi, Tanaka and Miyazaki (2013) shortlisted university students who showed an interest and potential in developing an *app* using the visual, drag-and-drop code building blocks of *App Inventor*. Interestingly, students were provided with little support and perhaps not surprisingly, only two of the four students persisted with the tool. In the second example, investigators explored whether postgraduate preservice science education students could integrate technology into their teaching and develop their digital literacy confidence by using *GeoSciTeach* (Kirkwood & Price, 2014). Students were asked to design a 45-minute fieldwork learning activity. While the application promoted a constructivist approach, the feedback from students was mixed. Among its reflections, the authors reported that to be effective, new tools need a learning framework such as classroom guidelines embedding technology in the curriculum. In the second category studies focus on

students studying technology. Hsu and Ching (2013) asked online programming postgraduate students to develop an app-reporting that even though the students were working in the digital space, learning how to use a design tool was a challenge. In contrast to Yamamoto et al., (2013) the investigators found that the learning experience was very positive with students immersed in a well-supported virtual learning community. Every student completed their *app* and reflected on their experience with a sense of empowerment.

Such studies provide sound advice for those interested in asking students to develop apps. Importantly it appears that developing an app is very difficult for students not enrolled in computer programming higher education courses. With this in mind, it was decided to limit the task to wireframe design. However, it appears that there is a gap in the research into the use of wireframes to assess undergraduate learning outcomes. This study investigates the gap by setting out to provide students with the opportunity to demonstrate the application of adolescent counselling theories and concepts through the design of wireframes. As such this study set out to explore the following questions:

1) How does the design of wireframes promote deep learning by undergraduate counselling students of the theoretical and practical principles of counselling adolescents?'

2) To what extent do students engage with and evaluate the benefits of TEL?

Methodology

This study used an evaluation framework as the overarching methodology. Program evaluations emphasise "how educational and social programmes are implemented, how they operate, and what effects they have" (Lapan, 2004, as cited in Lapan, Quartaroli, & Riemer, 2012, p.322). Alammary, Sheard, and Carbone (2014, p. 446) cited Sharpe et.al.'s (2006) recommendation that "iterative course redesign should consider evaluative feedback as a critical success factor". In this study, evaluation was used to establish whether learning outcomes could be met by designing wireframes. Within this framework is a methodology design which defines how the data is collected and analysed. This study used a concurrent mixed methods approach (Creswell, 2009). Amongst its many benefits is its strength as an explanatory process (Cresswell, Pano Clark, Gutmann, & Hanson, 2003). Such methods are in keeping with the review of studies conducted by Kirkwood and Price (2014) who listed interventions that collected multiple data sources. This included retention rates, self-report surveys and interviews with teaching staff (Connolly, MacArthur, Stansfield & McLellan, 2007); grades and analysis of online student postings (Xie, Ke, & Sharma, 2008); interviews with students (Zorko, 2009); and reflective activity (Cubric, 2007).

The Intervention

All students enrolled in the unit (N = 41) were invited and agreed to participate. The median age was 22 and there were 35 females and 6 males. Ethics

approval was granted by the Human Research Committee. While students had to complete all of the assessment tasks they were able to choose whether their work would be included in the study. To ensure that students were aware of their rights they were provided with a consent form explaining common ethical concerns including that they would not incur any penalty should they not wish to participate; and that their reflections on the task (either positive or negative) would not impact their grades.

To facilitate learning students were asked to divide themselves into groups of five. This decision was underpinned by the theory of collaborative learning where students have

the opportunity ... to share and discuss the actions they take, and the products they make, in the practice environment. This … enables them to learn from and build on the outputs of their peers, and to share their reflections and interpretations of what happened within their practice (Laurillard, 2009, p. 10).

Five was also deliberately chosen on the assumption that a larger group would have fewer gaps in digital literacies and thus would weaken emotional responses such as feeling anxious because the task was so novel. Once in their groups students decided on the adolescent mental health issue they would pursue.

There were three learning and assessment stages. In stage one, students independently explored a number of existing apps related to their chosen mental health issue. As part of their exploration students were required to produce a 2000 word essay regarding the signs, symptoms, diagnoses and counselling theories used in the treatment of the health issue. They also contributed to an informal online discussion on mental health problems common to adolescents. This assessment fed into the collective understanding of the group. In stage two, students were required to design wireframes and deliver a 20-minute presentation to their peers using PowerPoint. A review of design drawing tools found that Pencil Project was easy to use (Evolus, 2016). It could also export images to PowerPoint. Students needed to demonstrate that they could apply their knowledge of the health issue, and theory and concepts of counselling by arriving at a suitable design; including appropriate features, functional layout and sequence. This was expressed through the marking criteria: (1) knowledge of mental health issue and associated counselling treatments; (2) understanding the target users of the app through the use of creative and appropriate designs; and (3) presentation of the wireframes design. The third stage involved students producing an individual written reflection of their learning and insights into designing their app including the strengths and weaknesses of the experience of the process.

During lectures and tutorials, students learnt about the theoretical approaches and practical strategies in managing mental health issues in adolescents. They were also introduced to the wireframes software in a tutorial in week three. Across

the semester students were given time in the tutorial and access to an online discussion forum to check in with the lecturer regarding their progress.

Data Collection

Common to evaluating learning is the problem of comparing the results of one cohort to another. As such, no comparisons were attempted in this study. To determine the quality of student learning two types of data were used. The first was observational data which provides the researcher with the opportunity to look at what is taking place in-situ rather than second hand (Cohen, Manion, & Morrison, 2005). In this study observations included grades earned for the presentation of the wireframes as determined by the markers against the marking rubric and peer judgment. The second was qualitative data in the form of student reflective journaling.

To allow for inter-rater reliability all three researchers and an independent marker who was a colleague in the discipline assessed the presentations. In addition, a pre-moderation meeting was held to calibrate the markers. To review examples across a range of grade bands a post moderation meeting was also held and double marking of all high distinctions was undertaken. Deliberations after the presentations found an agreement rating of 90%. The presentation was also video recorded so that the markers could return to the source should they require.

Sadler (2010) argues that classroom feedback should go beyond the idea of teacher-delivery and provide students with opportunities to evaluate themselves and their peers as a strategic part of the teaching design. In this way, it is argued, that students develop explicit and tacit knowledge allowing them to judge quality and explain their judgements. As such students were given the opportunity to judge the presentations of their peers rating them from strongly agree to strongly disagree using the Socrative mobile tool (Socrative, 2016). The five questions from which a mean rate was established were: the presentation was engaging; was clear; there was flow between ideas; the proposed design is likely to meet the needs of adolescents; and that of their counsellor. The mobile tool was deliberately chosen in keeping with the development of student digital literacies.

Data Analysis

The analysis of the qualitative data occurred in three stages or what Attride-Stirling (2001) calls "thematic networks". At the first stage data is broken down into "basic themes" which in stage two are subsequently gathered into "organising themes"; clusters of similar issues. The third connects the organising themes at a "global" level. Merriam (1998) describes this analytical process as "the findings" where there is movement back and forth between concrete pieces of data and more abstract themes, between inductive and deductive reasoning, and between description and interpretation. Related clusters are thus formed into "conceptual matrices". This study used "meaning categorisation" to first analyse the student reflections where every reflection was coded according to basic themes (Kvale, 1996). This involved reading through the reflections several times to identify any

phrase or sentence that was conceptually consistent. Kvale (p. 199) notes that one of the benefits of meaning categorisation is that it "gives readers a background for judging how typical the quotes used in the accompanying qualitative analyses were for the interview material as a whole." All reflections were hand coded by a sole researcher. To increase reliability a sample of the reflections were also coded by the research team and any discrepancies were discussed and resolved.

Results

In the grades from the markers (see Table 1.) all groups rated at least a credit on the criteria "research and knowledge" and "understanding of target users' needs." The highest grades were earned by Group 1 and Group 2. The two groups with the highest marks had one "mature age" member each. Interestingly, peer ratings (see Figure 1.) were highest for Group 4 who earned when rated by the markers. However, there was strong agreement between markers and peers that the weakest presentation was delivered by Group 9.

Table 1. *Excerpts of marker feedback and grades*

Group	Feedback	Grade External Marker	Unit Coordinator
1	A very sophisticated presentation. The most impressive visually	HD-	HD+
2	The most integrated app regarding service providers and clients. Outstanding!	HD+	HD-
3	A good discussion of limitations	D-	D-
4	Good focus on facilitating connection between users	D+	D-
5	Best integration to other apps	D-	D-
6	Issues about self-assessment … otherwise great integration to games	D-	C+
7	Great voice over guided instructions	D+	D-
8	Great mind map focus	D+	D+
9	Maybe to wordy for adolescents - not a quick read and less useful as an app	C+	C+

Figure 1 identifies the mean ratings that peers gave the presentation. It is satisfying to see that the ratings correspond with the grades and the feedback from the markers.
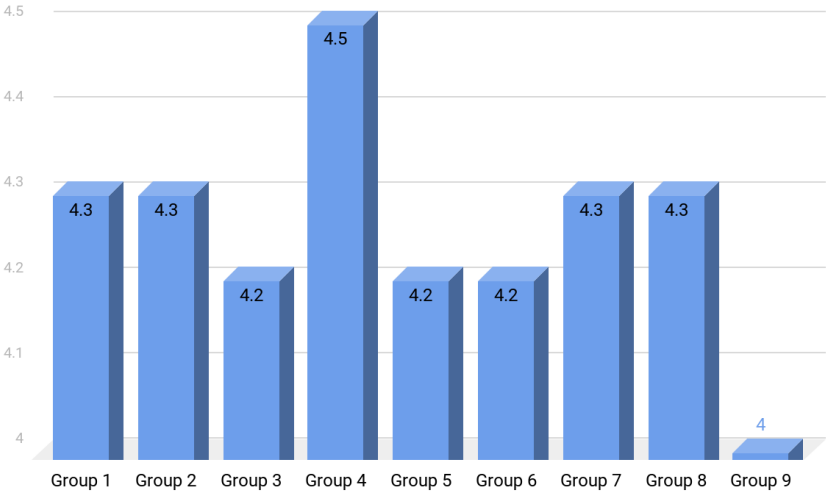
Figure 1. Peer rating of presentations

Analysis of the reflections by students led to the development of the thematic concept "technology enabled learning in counselling education." It contains three clusters: unit learning outcomes; pedagogy; and wireframes. The themes which emerged from student reflections were arranged within those clusters and are illustrated in **Table 2** below.   The clusters provide a roadmap for the use of wireframes as an assessment task and strategies for improving the learning experience, especially in relation to counselling young people with mental health concerns.

Table 2. *Concept: Technology enabled learning in counselling education: "it opened up a new side to my understanding of counselling through technology"*

Clusters		
Unit learning outcomes	Pedagogy	Wireframes
Themes within the clusters		
Description and application of theory	Collaboration	The technical side
Understanding layers of influence on adolescent mental health issues	Learning with peers outside classroom	
Design insights into counselling using apps	Visible learning - meeting the outcomes	

Unit Learning Outcomes

The success of this project ultimately rested on students achieving the unit learning outcomes. All students earned a pass or better for their reflective work. The analysis of their reflections revealed, not surprisingly given the marking criteria, that students understood adolescent mental health and were able to make relationships between this knowledge, counselling strategies and its basic tenets and the role that an app could play in supporting their work as counsellors of adolescents.

Description and Application of Theory

An analysis of the reflections found 141 "mentions" of counselling theories, suggesting that there was generally strong knowledge of adolescent mental health issues and how this knowledge can be applied to apps. There were 50 mentions of the relevance of different counselling approaches in working with young people and 36 mentions of incorporating the practical elements from theory. A good example of this is seen in the following quote:

> The journal and reflection features use elements of psychodynamic therapy and CBT … this allows the user to discuss their experiences of anxiety. With access to previous entries and reflections, the user can begin to recognise and understand their symptoms, pinpoint where these outbreaks occur and therefore gain insight to where their anxiety originates from (Student 6).

Understanding Layers of Influences on Mental Health Issues

The data demonstrated that students understood that mental health is complex as it was identified as the second highest matter referred to in their reflections. In

this cluster students provided views regarding critical issues related to the task of providing counselling using apps and emphasising the parameters of the counselling relationship. Also critical to these soon to be counsellors is that they understand the importance of access to care: "The reason that we wanted to include parents' or guardians' phone numbers was because we had a focus on family based therapy" (Student 11). It is interesting to reflect on the fact that only two mentions were made about the need to ensure confidentiality.

Design Insights into Counselling Using Apps

Students provided reflections (32) on how the counselling relationship is critical to the design of apps. As above, the items appear in the order of the frequency that the matter was mentioned. It was encouraging to see that an empathic understanding of adolescents experiencing mental health issues was the most cited practice. Some drew on their own experience, for example: "we started drawing on ideas as to what we would like to use if we were adolescents again" (Student 20) and "the use of words such as "kind" and "unkind" can reflect an understanding, care and empathy that may benefit the user during difficult times" (Student 21).

A focus on holistic counselling was identified in the analysis. A good example of this is seen in the following reflection:

The 'self-help' intervention section … followed an integration of a psychodynamic and CBT avenue in that the use of mindfulness-based cognitive therapy (MBCT) was explored. This notion brought about the introduction of somatic experiencing which is a significant type … combining the exercise of concentration and physical sensation to overcome trauma (Student 12).

It was clear that students understood the role of apps in the lives of these vulnerable young people with seven mentions of methods to encourage adolescents to engage and use their app to help them manage the mental health issue. Strategies included games that increase concentration levels and manage unhelpful behaviours and "allow the user to become self-aware of their emotions and bring repressed emotions into the conscious mind" (Student 6). Students also identified the importance of assisting in the development of "insight" using "functions to allow them to program push notifications, which allows pop up notifications" (Student 14). While not on the minds of many, creating a safety net where young people could either manage their issue or seek help. Students also identified the importance of incorporating agency into the design: "it will enable adolescents to maintain a balance between competing agendas in their lives by giving them control of their own schedule … primarily a self-monitoring device, when shared with a counsellor" (Student 23). Including a mood tracker as part of agency was also mentioned where the design "enables the adolescent to choose their mood in order to determine their level of distress and to become self-aware in relation to their emotional state" (Student 21).

Pedagogy

As identified by Laurillard (2009) and other proponents of TEL, the pedagogy underpinning this assessment was group work and it was thus important to gain an insight into the learning experience. The analysis of the reflections led to the identification of four themes: collaboration, learning with peers outside of the classroom, visible learning and scaffolding.

Collaboration

Across the cohort group work was mentioned 127 times; students reflecting on the challenges and opportunities posed by that completing this task in groups. The majority of the mentions (35) demonstrated that students enjoyed the experience of working in their group:

> Once a member had completed a wireframe, they presented it to the rest of the team. That wireframe was then assessed and critiqued. Feedback was provided to the individual creator and if in need of adjustments, changes were made (Student 11).

The data strongly suggests that students found the opportunity to be autonomous and creative positive: "each member had input into their vision for the app and how to accomplish it. Each member brought individual strengths which allowed for a creative and diverse app" (Student 6). Nonetheless, it appears that not everyone shared this experience. There were mentions of dissatisfaction (20) with one group in particular "struggling with group communication" (Student 11).

Learning with Peers Outside Classroom

Perhaps it is not surprising that while reflecting on how they worked with their peers there were 32 mentions of how students used technology to facilitate collaboration outside of the classroom or within the physical spaces of the university. Students identified the following social media applications in order of popularity: *Facebook*, email, *Whatsapp*, texting and *Skype*. These platforms not only allowed students to share their work but were also used to reduce the anxieties associated with group work as seen in the following: "confident that each person was doing their work because of constant emails and Facebook messaging" (Student 31). The following quote also spoke to how well social media tools provide for engaged and authentic group work:

> kept an online chat going to keep each other updated on what we have done, and what we need to do. This allowed us to send photos and ideas, and then critique each other as to what we thought would best benefit the group (Student 2).

Google docs was also identified as an online collaborative discursive space as it was more efficient than "emailing it back and forth" (Student 18) and provided the opportunity "where we could constantly add and edit each other's ideas" (Student 38).

Visible Learning - Meeting the Outcomes

Students wrote about being challenged by the task:

> I've never done anything like it before. And developing something new like a wireframe for an application is scary as you don't know if what you are doing is right and or wrong (Student 22).

However further analysis of the data found that students also experienced transformative learning. Given that this response is what educators aim for it is worth including a number of accounts:

> we progressively adjusted to the activity … learning how to use a new program and having to design an application from scratch was difficult at times, however, once it was completed, it felt rewarding to look at what we had accomplished (Student 29).

> It was challenging because it differed from other assessment tasks, however it was rewarding because I was proud of our creation and enjoyed working with my team members over the duration of the assessment (Student 1).

> was not only challenging and different, but allowed us to work in a group environment, sharing and using skills such as graphics and design we would not usually use in a regular assignment (Student 8).

> was a very interesting group process that I had not encountered before in my bachelor's degree. While it was quite difficult at first to wrap our heads around the process, we enjoyed creating the app and were very pleased with the end result (Student 10).

Wireframes

The third cluster grew out of the identification that the level of digital literacy skills proved challenging. While some students felt competent using Pencil Project to illustrate their wireframe design, others initially struggled.

The Technical Side

Some students provided an account of the level of technological expertise within the group and the level of sophistication required to complete their work. The mention of limited expertise was double that of reports of being competent from the outset. Those who were competent outlined how they made decisions regarding the best tool for the task; for example: "we decided on the use of an iPad template, rather than a simple smartphone ... it allowed us to play around with more space and fit as much as we could on the screen without overwhelming our users" (Student 8). In contrast, a small of students reported that the experience was negative. This is particularly evident in the reflections of the first few weeks: "we were not clear on where we were meant to start" (Student 16) and "quite confusing at first … a bit difficult to start and put all our thoughts and ideas together" (Student 20). Clearly there is room for improvement in future iterations

of the task. A good example of such a reflection is provided from Student 25 who wrote:

> Overall, … successful in teaching me new facts … I do think that this assignment idea of creating an app should be implemented again for future students, but the idea of each group creating a wireframe of fifteen slides shouldn't be, as we are all counselling students not technical electronic students studying computers and software.

Discussion

This study found that asking undergraduate counselling students to design wireframes as an assessment task provided them with a positive and engaging learning experience. Students demonstrated that not only did they understand the signs and symptoms of adolescent mental health issues such as anger, eating disorder, anxiety, and depression, but also showed strong practical and innovative approaches of theoretical and therapeutic counselling characteristic of best practice in treating these mental health disorders. Traditionally, concepts associated with the therapeutic relationship between counsellor and client are often taught in supervision, and case demonstrations (Tolan & Lendrum, 1995). However, students who are yet to undertake professional placements demonstrated a strong understanding of critical concepts such as holding an empathic relationship, developing systems of care, safety, confidentiality and agency in working with a client (Skovholt, 2012). Indeed, it is possible to argue that the opportunity to design wireframes facilitated a phenomenological understanding of adolescent issues, as well as an empathic stance with them. The nature of the cohort where most students are adolescents themselves, is also likely to have increased the engagement and facilitation of knowledge, skills and application (Kenny et al., 2016) Moreover, the wireframes design process challenged the theoretical certainties some of the students held in regards to the use of one specific theoretical approach. Instead, students were encouraged to look to more holistic and integrative approaches. One content area that no group incorporated was the psychodynamic model. Reasons for this would require further investigation.

The cumulative assessment framework meant that students first had to individually develop their knowledge of the mental health issue and then later work with the tool as a group. To be successful, students needed to truly work in collaboration with one another. The reflections also demonstrate a commitment, shared responsibility, pride and ownership of the work as a group. Students were able to use social media to maintain their engagement, but also to reduce the anxieties often experienced in group work including "social loafing" (Ying, Jiang, Peng, & Lin, 2014).

Indeed, most students reflected positively on this task and even those few that initially felt uncertain, ultimately reported that the task was a successful learning experience. Furthermore, it is expected that these new skills will usefully assist

students to be more discerning in their choice of apps as professional counsellors. While some students reported being stymied by the unfamiliarity of the technology it appears that many discovered new digital abilities in software product conceptualisation and design. This is important given that the world of smartphone technology has revolutionised the field of adolescent mental health work which is often categorised by adolescent resistance to engage in traditional mental health practices as well as being cost effective (Kenny, Dooley & Fitzgerald, 2015). With further technology developments, it may be possible to include new interfaces with smartphones such as video that can connect users with their therapists (Luxton, McCann, Bush, Mishkind, & Reger, 2011).

This study departed from the "spoon fed approach" which required students to complete an essay assessment task. Instead, it engaged with processes central to integrative learning such as learning by doing and reflection (Dehler & Welsh, 2014). It is relevant to note that early wireframes are usually designed with lowest fidelity to keep the focus on general function presentation and sequencing (Arnowitz, Arent, & Berger, 2010, p. 274). This practice was relaxed as students were allowed to explore the use of colour, images and some personalised branding to enable them to successfully demonstrate a design of an app that would appeal to adolescents. This enabled the students to produce exciting designs that became a pleasure to create and present. It was not surprising however to find that students initially lacked confidence with app design. Despite the often promulgated idea that today's students are digital natives, our experience corresponded to those of Yamamoto et al. (2013) and Hsu and Ching (2013) where students needed a lot of support. Despite accommodating for the expectation that students might find the experience stressful and incorporating a session on Pencil Project into the tutorial plan, a minority of students identified that they would have preferred more support. However, instead of succumbing to anxiety, overall students demonstrated the ability to mitigate ambiguity and were, motivated as a group to achieve the task and reach their outcomes (Varasteh, Ghanizadeh, & Akbari, 2016).

Conclusion

This study confirms the potential for non-technology focused courses to use the design of wireframes as an assessment task. Indeed, this appears to be the first reported study of its kind. Students were not only able to demonstrate that they had met the learning outcomes, but reported that it was a rich and collaborative learning experience that appears to have positively influenced motivation and engagement in the unit.

While it is powerful to compare the performance of students, comparison was never a goal of this study for two reasons. The first accords with the well-established methodological weakness of comparing cohorts across time. To explore a comparison wold have meant giving students a choice between the traditional individual essay and the wireframe design. However, considering what we know about how fear impedes the uptake of technology and that there is a

strong dislike of group work by many students, it seems reasonable to assume that most students would not have chosen to undertake the wireframes task.

There was a small minority of students who thought that greater support would have been useful and despite an independent marker, it is possible that more students may have expressed problems with the task if it was not linked to a grade. Nevertheless, the views provided by the students offers important feedback which will be included in the second iteration of this task. This will include a short video from the lecturer about the nature of the task allowing students to check their understanding, and exemplars of tasks from the cohort of this study. In addition, incorporating support channels such as "online chat" where students could ask the lecturer questions might help ease the associated anxieties.

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