

A Personalized Approach to Flexible Learning

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Abstract: In a higher education environment massively disrupted by the pandemic, the importance of exploring the efficacy of purposeful, flexible, online learning is essential. Research shows that blended approaches to learning can be active, flexible, and student-centred. However, this research suggests that without human intervention or a bespoke context, there can also be very poor engagement. As such, this study presents the successes and challenges of introducing a personalised mobile-learning resource in a supported, personalized environment. The resource was designed and developed in 2019 and integrated in 2020 and 2021 into a large (n=200+) communication design class at an Australian university. This paper evaluates the effectiveness of the app using measures drawn from Abdullah & Ward's (2016) take on the Technology Acceptance Model. Their model, GETAMEL (general extended technology acceptance model for e-learning) measures technology acceptance factors in eLearning such as enthusiasm, self-efficacy, and student enjoyment of technology in relation to contextual purpose. This paper also considers the value of self-directed learning and co-curricular activities in the context of additional learning to support core curriculum. This paper presents an evaluation of student experience drawn from a class-wide survey and analysis of usage data. We conclude that the use of a personalised app fosters an autonomously supportive experience that leads to intrinsic motivation and improves overall learning (Baker & Goodboy, 2018). The app provides additional support for students unable to attend tutorials and enabled students to remain engaged and abreast of the general topics each week and provided some additional prompts about self-directed learning activities they could engage in, that they wouldn't have otherwise had. Enjoyment, as one of the key factors of the GETAMEL model, was explicitly mentioned by students. While a personalised tool is labour intensive and expensive in cost and time, this study concludes that the rewards regarding student experience make it worthwhile.

Keywords: personalised learning, GETAMEL, technology acceptance model, flexible learning, mobile app

1. Background

Delivering learning activities in higher education that are personalised to the learner is generally a challenge. We often rely on off the shelf solutions to support student's technical learning. While these solutions support our learners, the impact varies, for students at different skill levels, for students who are non-native English speakers, and for students who would benefit from targeted tutorials or one to one support. In this paper, we share the success and challenges of introducing a personalised mobile app to support autonomous learning. The students in this study use Adobe Creative Suite as part of their course activity and assessment. In 2019, we developed a personalised mobile application (app) to support a large design class (200 plus students). This app was used to support new cohorts in 2020 and 2021. The app was used synchronously with face-to-face classes initially and then asynchronously as classes moved to fully online during the Covid-19 lockdowns.

On this design course, it is generally expected that students have a working knowledge of Adobe Creative Cloud software applications. However, the reality is wide variations in ability across the cohort. Although students have free access to a wide range of generic training, such as video tutorials on LinkedIn Learning and You Tube and the help that comes with the software, student feedback suggested that the videos were too generic and too long. Our students reported being overwhelmed by the length of videos and frustrated at having to sift through the content to find support relevant to the course curriculum. They were also confused when directions or terminology did not align with the teaching materials. This encouraged the course team to design a mobile app to serve as co-curricular support.

The app was designed on the Articulate 360 platform and consists of 23 bite-size learning activities organised across 10 weeks of learning. Learning activities are aligned to course content and are interactive. They consist of a mix of self-assessment activities, definitions, and keywords. The app is interactive and allows students to hover over specific areas in order to receive guidance. The app is designed to offer a range of learning activities

such as matching exercises, step-by-step tutorials, demonstrations, quizzes and diagrams that explain relevance supported by how-to videos.

This study considers the impact and effectiveness of this personalised app through an analysis of survey data and student usage. Evaluation of the data is based on student experience in relation to evidence-based practice. The following literature review considers student motivation and autonomy, the eLearning technology acceptance model and approaches to m-learning.

2. Literature review

It has been suggested that personalised learning can overcome barriers including age, gender, motivation, and self-efficacy (Rabin et al., 2020). Indeed, personalised learning can often improve student satisfaction and offer a rewarding and autonomous experience for learners (He et al, 2019). Giving students autonomy over their learning enables intrinsic motivation which improves engagement with learning generally (Baker & Goodboy, 2018). Cochrane et al (2017) also found that giving learners control of the navigation and pace of their learning has a positive impact on student engagement and motivation. Furthermore, we know that aligning learning activities to learning outcomes and assessment also positively impacts student behaviour and motivation (Biggs & Tang, 2011; Garrison, 2011; Laurillard, 2002).

When using the app, students are expected to identify their own knowledge gaps and take responsibility for self-directed learning (Picciano, 2009, p. 2). Self-directed learning enables students to diagnose their own learning needs and set their own goals for learning (Knowles, 1975). Developing strategies for self-directed learning in higher education is important because it supports the motivation to learn and affords a sense of self-belief for the learner (Boling et al., 2012; Santhanam et al, 2008). Additionally, the design of eLearning activities should offer users choice in ways to engage, in order to support self-efficacy and motivation (Chen et al, 2015). Otherwise, learners remain passive if they are not given “genuine choices with regards to what, when, and how they learn” (Amponsah et al, 2019, p. 88). Indeed, we found this to be the case, students end up frustrated if they consider the support as too vague. This means that choice of activities, targeted learning and well-designed navigation are needed to support learner autonomy.

One of the key issues of introducing e-learning successfully in higher education is making sure that the tools and technologies are purposeful for the learner. Indeed, it has been found that students are more likely to view online support modules positively when they exist to support core learning (Yeoh et al, 2017). Traditionally, the technology acceptance model (TAM), a behaviour-based framework, is used to evaluate how users will engage with technology and be receptive towards using it. TAM essentially focuses on three factors: perceived ease of use (PEU), perceived usefulness (PU) and the attitude towards use (Davis, 1989; Granić & Marangunić, 2019; p 2574). Over time, TAM has been further extended to include additional relationships, for example, social influence and trustworthiness (Abdullah & Ward, 2016; Venkatesh & Davis, 2000). While TAM is a criticized framework regarding information systems development, it is reasonable to suggest that this framework has influenced systems design for many years (Granić & Marangunić, 2019). In higher education, TAM has been adapted by education communities as a “common ground theory” in the acceptance of e-learning literature (Abdullah & Ward, 2016; Granić & Marangunić, 2019, p. 2575).

In their extended review of e-learning adoption in higher education, Abdullah & Ward (2016) adapt the TAM framework into a version entitled GETAMEL (general extended technology acceptance model for e-learning) (Abdullah & Ward, 2016, p. 238). The GETAMEL framework breaks down the common factors of perceived usefulness (PU) and perceived ease of use (PEU) into the predictors for how students will engage with e-learning. This helps to identify what motivates our students to use a new e-learning tool. For the purpose of this study, the GETAMEL predictors align with the concept of contextual (personalized) design and intrinsic motivation.

In the GETAMEL framework, the key reasons for perceived usefulness (PU) of an eLearning app include student sense of enjoyment in using it, their expectation that it needs to be used (which often comes from peers and tutors), their confidence in being able to use the tool (self-efficacy) and their prior experience with similar interfaces. The key factors for perceived ease of use (PEU) of an eLearning app also include self-efficacy, enjoyment, previous experience with similar, expectation that it should be used and a lack of fearfulness or anxiety about using it (Abdullah & Ward, 2016). These were identified as appropriate measures from which to consider how students in this study engage with and view the app as part of their learning.

Finally, the app is designed to be used on a mobile phone, we know that purpose-built applications like this can maximise a smartphone's affordances for mobile learning (m-learning). Geddes (2004) defines m-learning as "the acquisition of any knowledge and skills through the use of mobile technology, anywhere, and anytime" (p.1). While familiarity with the platform will support perceived usefulness and perceived ease of use, studies have also found that lower levels of English language proficiency and lack of technological skills can negatively impact success of eLearning (Geduld, 2019). However, we believe that the potential for visual communication as a personalised learning mechanism, that breaks down such barriers, is not always recognised (Müller, 2007). We believe that a visual and interactive app, such as the one created, offers a more visual medium that can increase clarity and transcend language barriers (Carbonell, 2016).

3. Research methods

This research was undertaken by survey and the evaluation of student usage data. Students were invited to participate via email. 80 students took part in 2020 and 62 students took part in 2022. The surveys consist of 6 demographic questions, 10 Likert scale questions focused on self-directed learning and an additional 10 Likert scale questions about use of the app and generic off the shelf support. Students were given an opportunity to add qualitative comments to their responses. The analysis of student usage used basic analytics to establish the number of times the app was accessed and timing of that access.

4. Analysis

4.1 Analytics of student usage

We found that use of the app coincided with days where synchronous learning activities occurred. In 2020, tutorials were timetabled on Wednesdays with one tutorial on a Thursday. 36% of use for the week was observed on a Wednesday. The next highest usage was on a Tuesday with 14%. Therefore, 50% of use happened before, during, or after tutorials on days when students were either preparing for these tutorials, consulting the resource during them, or refreshing what had been covered after these tutorials. The survey data supports this finding, students report relying on the app as a supplemental learning source before and/or after class.

I would mainly use it before the tutorials, so I was able to prep myself and expect what was going to happen in the tutorials.... I would use it afterwards because it's more like refreshing my memory for the assignment. (Student with limited experience of Adobe)

For both years, analysis of analytics re usage indicate that the app was used more in the first half of the semester and again when assessment was due. The app was used at least once or twice a week at the start of semester and once a week towards the end of semester on both years. Student usage also indicate that 92% of student accessed the app at least once. In the qualitative data from the survey, students support this finding,

I like to start things straight away at university in the week before the semester starts. I usually try to do as much as I can so that I don't fall behind 'cause it feels like a constant rat race, so I remember when the app lessons first came out, I literally did the whole thing in like 2 days or a day and a half. (Student confident of using Adobe)

4.2 Support for autonomous learning

In the survey analysis, 76% of respondents agreed that the app was helpful to their learning. 21% felt indifferent towards the app and 3% said it was not helpful. 93% of respondents agreed that being able to revisit materials helped their learning. 81% of respondents agreed that being able to work at their own pace helped their learning. 90% of respondents agreed that they enjoyed having access to the resource outside of synchronous class times.

4.3 Generic v personalised

Less than half of the students surveyed had tried generic resources to support their understanding of Adobe Creative Suite. Students with limited experience were more likely to use both personalised and generic tools. Those that had used the generic resources found them generally useful. However, within this smaller group, they found the course app to be more relevant, cohesive, and consistent compared to LinkedIn Learning or YouTube. The lack of focus and information overload in the generic solutions was a turn-off for students although they did express an appreciation for the high production quality of the resources. Comments included

I was quite put off by the LinkedIn videos just as soon as I saw how long they went for as I was like, oh God, I don't have time for that. Whereas, with the course app, you don't have to do the whole thing. You can see what you want to get out of it. In contrast, with the LinkedIn ones, you have to watch the whole

broad video and then from that, you might only get like two things that you actually wanted to ask about. Yeah, so you're just not wasting your time I think, with the course app.

Students were pleased to have access to personalised learning and found the course app supported the learning activities and helped deepen understanding. This was particularly notable around concepts, terminology and processes that are known by specific names in industry and in core curriculum. Students also found the course app more credible.

I think I sort of trusted it [the bespoke learning resource] a bit more because it felt like it was made by you for me as opposed to very general random videos that might be on the subject area, but perhaps not all of it's necessary to the assignments we're doing. I felt like the Pocket Tutor was all just necessary information and because it was necessary information, that's going to motivate me to actually listen to that properly and know that all of what I'm listening to and reading here is vital.

I found it [the course app] a lot more helpful than I found LinkedIn learning videos and resources like that. It's got those little diagrams and stuff in it and it sets out what you need to do. I'm very task oriented when I do stuff. So, the way the course app was set out was sort of like these are all the things that you need to do for this week. And these are all the steps you need to take, and it helped set it out for me really clearly. And I really liked that and the practical aspect of going through it and then practicing it while I was going through. As opposed to like learning from a video and then having to go back through the video when I encountered certain problems again.

Students also suggested that the course app helped them to manage expectations which reduced stress and increased self-efficacy. The main barriers that emerged from the survey data was the additional distractions that come from a mobile phone. Students suggested that unintended distractions, including news alerts, message notifications, and phone calls interrupted their learning.

4.4 Student insights

Students overwhelmingly suggested that the target audience for the course app are those who were brand-new to the software or those who hadn't used the software in some time and needed a refresher. This extended to students who had missed tutorials and would otherwise be behind or confused without such a resource. They saw the value of it as extra-curricular support that freed up valuable time with the teaching team

The course app is great for students who maybe can't always pay attention in the lectures. Sometimes I'll miss what [the professor] says. I'm not always present in the lectures, all the way through, and that's why it is good. I like the short ways to learn. The short videos are good. I can't concentrate for a whole lecture.

Students suggested that the app was a safe space to explore, feel more comfortable with, and get initial questions answered without having to risk asking questions in class. 71% of students who said they experienced anxiety regarding the technical requirements of the course used the app

I think the app is ideal if you didn't like the in-person style. If you were an introvert or classes were too overwhelming for you. Maybe if you had social learning difficulties as well. I can imagine not everyone feels as comfortable talking to their tutors. So I think that the app would probably be really good for them cause they don't have to go through that awkward interaction in person.

5. Discussion and conclusion

Overall, the integration of a personalised learning resource can be seen as useful and warranted in a skills-based and technology heavy, higher education course. The app is not a replacement for curriculum, learning activities or content, but an opportunity for students to self-learn technical applications through a scaffolded and context specific approach. The benefit of this personalised approach over off the shelf, generic solutions has been clearly identified in this study. The personalised approach offers consistency with the core curriculum and industry and discipline specific terminologies. This enables deeper understanding about core concepts and develops students' self-belief in their ability to use the technologies to support their learning. Offering a personalised approach to learning makes content more relevant for learners, affords opportunities to ensure that learning supports the diversity of the student cohort and encourages and motivates students to learn. The relevance of this app was highlighted through the high number that used the resource (92%) as opposed to less than half of the cohort using the off the shelf support from LinkedIn Learning or You Tube.

The flexibility regarding access is important, m-learning offers opportunities for students to access the resource at times that suit them and offers ease of use. It adjusts to varying screen sizes and although students did report some distractions from their devices overall, their experience with the app was considered valuable. The analysis of student's usage indicated that students used the supporting resources before and after synchronous classes

and at times when the teaching team staff were unavailable such as evenings or weekends. This helped to increase students' autonomy and self-directed learning potential (Baker & Goodboy, 2018) and helped to reinforce their learning. Additionally, the personalised learning was considered of benefit to those that could not attend synchronous sessions, which has positive implications for post covid learning and the flipped classroom.

Furthermore, this research demonstrates that students are willing and motivated to engage with extra-curricular learning activities if they are assured that it is of value and supports their core learning. They explicitly mentioned that the app was enjoyable, and enjoyment is one of the key factors of the technology acceptance model. Overall, the mobile app addressed key factors of perceived usefulness (PU) and the perceived ease of use (PEU), students enjoyed using it, and were confident using it because it aligned with expectations set by the teaching team, and it became part of the normal experience of course learning. Moreover, the mobile app supported students to find the PU and PEU of the Adobe Creative Suite which is essential to their ability to deliver good outcomes for assessment.

Finally, it is important to acknowledge that the development of the app was part of a graduate certificate course that one of the authors of this paper was enrolled on. Development, design and refinement of such a tool is a significant endeavour, as is the ongoing maintenance and upkeep which is not an issue when using generic learning resources like LinkedIn Learning however while there is rarely time allocated to develop such a resource, the evidence that has been gathered over two years of usage and survey data offers a compelling argument for creating and maintaining personalised learning to enable additional confidence in students with tech-heavy and skills-based university classes and to allow them to take more ownership over and responsibility for their learning. Ultimately, a personalised tool is not cheap from a labour, expertise, or time perspective; however, the overall rewards are worthwhile from a relevance, cohesiveness, engagement, and retention perspective.

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