Reflections on the development of a technology enhanced learning App through student–led collaboration

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Summary

The University of Bolton is a Teaching Intensive Research Informed (TIRI) institution. In 2016, a successful bid was made for the Higher Education Funding Council for England (HEFCE) Catalyst fund in Innovation in teaching and learning. The bid written by the principal investigators was based on their mutual interest in students as partners and the co-production of technology-based learning interventions. The project engaged undergraduate students researching their own student body, to discover the needs of the student community. This paper discusses the process of the technological development of a mobile app and reflects on the project incorporating student and staff voice.

Description of Project

Boyer's (1990) scholarship of teaching and learning (SOTL) is described by the Society of Teaching and Learning in HE's website (SLTHE, n.d) "as an emerging movement of scholarly thought and action that draws on the reciprocal relationship between teaching and learning at the post-secondary level"' with Hutchings, Huber and Ciccone (2011, p xix) identifying SOTL "as a broad set of practices that engage teacher's in a critical process to improve learning and teaching". Felten (2013) identified 5 principles of good practice of SOTL a) Inquiry into student learning, b) grounded in context, c) methodologically sound, d) conducted in partnership with students, and e) appropriately public.

All five of Felton's (ibid) principles informed this 'student-led research into technology enhanced learning in teaching and learning', which was the title of the proposal to the funder, which gave a broad title and milestones for success but avoiding providing granular details of the methodology or outputs. The purpose of the project was to engage learners in the co-creation of e-learning resources Student-researchers were recruited through a competitive process mirroring standard university practice for employment, providing an authentic employability experience. Fifteen undergraduate students, in the second year of their programme and from a range of different departments, applied for the research posts. Three students from three different school/faculty departments (Education, Psychology and Sports Science), were

appointed. A challenge in making appointments was that none of the applicants had the technological knowledge to develop e-resources; no applications were received from the School of Creative Technology (CT).

This was explored with CT staff, and it was discovered that students were not interested in research posts, but preferred project work as this reflected the model promoted by industry advisors. From this, the team (including student-researchers, development students and the two-academic staff) discussed the project and expected outputs and flexibly changed their approach that included time-bound project briefs to subsequently engage and employ creative technology students in an authentic manner.

The research process was co-designed with the student researchers. The research included an initial exploratory mixed-method questionnaire to the entire student population. This was followed by three student-researcher led focus groups with students. Participation in the focus groups was based on self-selection via the questionnaire. Both methods were employed to gain an understanding of current and preferred technology use for education purposes. Thematic content analysis was then undertaken by the student-researchers and validated by supervising staff. Questions explored current student usage, and potential engagement, with technology for education in order to inform the design of the interventions. Semi-structured interviews were also held with the Vice Chancellor, a dean of faculty, head of IT, head of recruitment and admissions, and the student union president to gain insight from a range of perspectives based on Brookfield's (2005) lenses and was based on availability of all senior staff who responded. The students led the design and face validity of questionnaires, carried out university-wide data collection with over 200 participants. The student-staff team recognised a gap in the research data regarding potential incoming students as it was recognised that technology was changing so quickly that what current students preferred may be very different to future students. To bridge this gap, the student researchers suggested engaging local college students in the research. The lecturers facilitated this arrangement with the local college, and the student researchers undertook a series of focus groups with 20 students from the college that were looking to transition to higher education. The student researchers were coached on interview techniques before undertaking the focus groups, and they then transcribed and analysed the data, again with support. Each student-researcher led on various aspects of the research such as questionnaire design, data analysis and conducting interviews, which was dependent on their skill-set and confidence and identified through skills analysis.

On completion of the initial research phase, the student researchers and staff worked together to provide a project brief that would develop a university-wide mobile application (app) to support learning and teaching. The app embedded social interactions, gamification of study skills and a utility app for wayfinding and monitoring of on-campus resources such as the availability of computers in public computer rooms. This project gave the student researchers the opportunity to develop a range

of employability skills; soft skills such as team working and communication, as well as managing others, summarising and reporting data, and presenting briefs for development. The project brief was based on the outcomes of the research data and included functional elements such as study skills, wayfinding, socialisation, and competitiveness. The student-researchers led the recruitment process of the CT students and were supported in managing the process taking them through the two sides as interviewers and interviewees.

Bids from the CT students were assessed by the team with input from all members of the team and specialist staff from the subject department. Four undergraduate CT students were employed on a short-term consultancy basis of 6 months to develop the university-wide app "UBolt" which was successfully launched at the start of the following academic year. The whole student team engaged with facilities, library and support staff, and academics to ensure that location and wayfinding functions were accurate and that the generic study skills content was accurate and supportive. Adopting the principles of 'Gamification' (Djaouti, Alvarez, Jessel & Rampnoux, 2011), gamified study skills content was accessed via clues in the app that led users to QR codes across campus to further support wayfinding. The Student Union supported the app by providing funding for prizes such as coffee vouchers for those using the QR codes and games. Over a quarter of the University's first-year undergraduates downloaded the app as well as students from across other years (1200 downloads).

Evidence of effectiveness and Impact

From the beginning of the project, the students were encouraged to discuss impact and dissemination plans. The students successfully co-authored an abstract for the RAISE (Researching, Advancing & Inspiring Student Engagement) Network Annual Conference and for the Change Agent Network national conference in April 2018. The student researchers also successfully submitted an abstract to the University of Bolton annual learning and teaching conference in 2017 and 2018. Authors Cross and Prescott were invited to present at a Universities UK conference on innovation and excellence in teaching and learning held March 2018 in London. Publications from the project are a case study focusing on how this project enabled students to participate in real world research skills and gain invaluable research experience and from this we propose START (Support, Time, Adapt, Risks, Trust) as an approach to engage students to gain real-world research skills (Prescott, Cross and Iliff, 2020). We have also published a book chapter detailing the development of the interventions (Prescott, Iliff, Edmondson, & Cross, 2019). The team, of staff and students, met on a weekly basis, over a 14 months period, to discuss and plan the project outline, developing timeframes, deadlines, training schedules, approaches to research and analysis with decisions being made collaboratively. The impact of the app is also apparent from a university level, as the university went on to purchase a commercial app and incorporated several the features from this project and its research findings.

Reflections on the project

> *"Presenting at a conference in front of academics who are not your teachers was a really scary experience, but a valued experience as not only were they from different subject areas but from different institutions."*

The student-researchers felt that they shared the same sentiment as other students on the positive impact of student-led research and learning communities reported in the literature (Tinto, 2000; Mercer, Kythreotic, Lambert & Hughes, 2011). These feelings were enhanced through their experience of an increase in confidence and self-efficacy levels in terms of approaching and completing scientific research, through the experience of collaboration and knowledge acquisition. They also reflected that their knowledge and understanding of research has developed beyond what they felt they would have learned as undergraduates.

> *"I have gained an enormous amount from this experience, including research skills that will help me in my third year for my dissertation"*

The involvement in a research project gave them direct applied experience in the research field and the awareness of a career in the research field. The students reported gaining skills that they believed are directly transferable into the workplace and made them more employable, including teamwork, time management, oral presentation experience, academic writing, critical thinking and networking.

> *"The ability to adapt research and work quickly is a skill I now value a lot, I hadn't appreciated the real-world context before. Which will serve me well when I get a job"*

From the project

'We have always valued the student voice, but this collaborative research project has highlighted the importance of engaging students more fully in the curriculum '

At the end of the project the students were asked to reflect on their experience, and it is these and our reflections we present. The students reported that the start of project felt very supervisor/staff led, with them relying on staff knowledge and expertise within their respective fields. For all of the student members of the team it was the first experience of being involved in a research project of a larger size from the start and they reported that they all felt overwhelmed and daunted to an extent. The students felt that the term 'supervisor' has connotations associated with a position of power and this meant that the students viewed the staff as being in charge and so they didn't always voice their opinions at the beginning. What is particularly interesting about the use of the term 'supervisor' is that the staff do not remember using it to describe themselves, but it was used by the students to identify the staff on the team. The staff members of the team were conscious of the dynamics early in the project and to an

extent it was supervisor/staff led as they had written the bid and knew the details of the project more intimately. The staff reflected that whilst they had tried to pass responsibility and ownership to the students this wasn't necessarily recognised unless it was explicitly stated though this changed as the students gained confidence and were much more willing to take control, with a particular milestone being the end of the initial research phase and the creation of the brief for creative technology students.

As the project developed the student researchers spent more time together working collaboratively on the project and as a result bonded well. In doing this their confidence grew, ideas were shared, and they supported each other by sharing knowledge. The project evolved through this collaboration into the intended student led research project it was designed to be. The students began to drive the project forward and voice their opinions as they became more competent and confident in their research skills and with the subject knowledge. The students reflected that the confidence developed could not have been achieved without the support of the staff and the sense of pride they had in their work meant that they wanted to gain recognition from the staff for their efforts. The project has facilitated an environment for the students to work collaboratively with each other and the staff going beyond class collaboration, as the team were from different disciplines.

The personalities of supervisors in successful projects have been shown to be crucial (Hall, 2015), the students felt that personalities and style of the supervisors/staff had a positive impact on the project. The students stated that 'both are very supportive, approachable and engaging, this in turn has fostered a sense of belonging, trust and empowerment in us as a team', which again has been demonstrated in research to be vital in collaborative partnerships (Kehler, Verwood & Smith, 2017). The supervisors also reflected on the personalities of the students, with some taking the lead and others willing to sit back and be directed, and the dynamics that were evident in the interactions, and without complimentary approaches the project would have been less successful.

Follow up and future plans

There were a range of challenges the team encountered and resolved during the duration of the project such as recruiting students, disciplinary differences, different working cultures, how to manage these effectively, as well as understanding the difference between management and leadership. Recruiting students was one of the main challenges that the team faced. The turnaround time for the HEFCE funding was relatively short and had very tight deadlines which meant that there was a sense of urgency and pressure to start the research project as soon as possible. The job description was written for research studentships, which unfortunately put some students and disciplines off. As discussed earlier there was also the issue of CT students not applying because it was advertised as a research studentship. Timing for submitting the bid and recruiting to the project was an issue. A longer recruitment period would have addressed some of the recruitment issues. Considering advertising more specific job roles/descriptions to engage a wider audience may have allowed for the recruitment of CT students earlier and eliminated some of the issues that occurred

such as not understanding technical limitations or appropriate timescales for production of the app.

> '*Managing different work ethics was frustrating, challenging, but kind of fun once we understood how they worked'. Student reflection*

The recruitment process for the CT students through briefs worked well to a point. The process mirrored industry process, but this needed some refinement to ensure that the briefs were communicated effectively. Changing this to an open briefing where questions could be asked, and expectations clarified before employment started may have been more fruitful.

The weekly meetings and tutorials were effective in managing the project and the students felt that this worked particularly well and that a formal induction period wasn't required. On this point the staff disagreed. A formal structured induction would have provided the students with a more scaffolded experience that could have built confidence much sooner and identified the disciplinary differences more explicitly allowing the staff to provide training much earlier. Both staff members felt that this would be needed in future projects. Staff took this insight forward as members of a university-wide curriculum design working group which contributed to the development of a graduate attributes' framework for future curriculum design.

> *'Working with the students gave a real insight into disciplinary differences that mirror the real world, and how those gaps and skills need enhancing in future curriculum design'. Staff reflection*

All of the student researchers felt that the collaborative project had enhanced their student experience beyond what they were expecting from their university experience, increasing not only their academic skills and performance but by creating opportunities to '*work with likeminded people from other courses'.* Also, socially with one student saying, *'we'd never have been friends before working on the project together, but I feel like I've made a friend for life*.' The students also valued and recommended the opportunity to work closely with staff, with staff members of the team valuing the student input and perspectives for teaching and learning. One student stated '*This project has helped me feel more confident in my ability with regards to my future aspirations, studying for a PhD wasn't on my radar. It has provided a great insight into the type of research that I will be required to do on my postgraduate studies and given me a better understanding than I previously had. I feel more prepared, less intimidated and less like an imposter.*

The staff members felt the collaborative project *'enhanced and supported the student experience through transitions and applicability of knowledge to work though an authentic employment experience'.* However, the staff also felt that more could be done to improve the project experience of both staff and students. If this was to be taken forward the staff members would make the following recommendations. Although we met on a weekly basis as a team, as previously mentioned, more dedicated staff time in order to fully support the student's development is needed. The staff felt a more structured induction program would highlight gaps in knowledge and skills sets, different approaches to work and expectations, of both the staff and students. It would also be advisable to provide students with structured research skills

workshops. It was observed that the students had varying different research skills knowledge and experience due to discipline requirements. However, the staff did have high, often unrealistic, expectations in terms of research capacity and knowledge. Research skills workshops to enhance and build on those research skills developed in the classroom is required. It was evident that real world research is at a different level for students from a structured classroom/module on research methods guided by a teacher. There was the expectation that students can transfer and apply these skills to another research context which evidently needed more support than initially presumed.

In general, the overall experience was a huge success in terms of the interventions (app and a virtual reality simulation) developed, engaging the students and collaboratively working with students as partners. Both staff and students involved in the project gained and learnt a lot from the experience. Two of the students are now planning on undertaking PhDs with the staff team as their supervisors. Students gained immensely providing them with numerous skills and experience, building on their student experience and engaging them across the university. Both the staff team and the students involved are enthused to encourage staff and the senior management team at the university to engage in more student collaborations as well as real world research. This paper also aims to encourage and inspire others to engage in similar projects within other institutions.

References

Boyer, E. (1990). *Scholarship reconsidered: Priorities of the professoriate.* Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

Brookfield, S. (2005) Becoming a Critically Reflective Teacher. San Francisco. Jossey Bass.

Djaouti, D., Alvarez, J., Jessel, J. P., & Rampnoux, O. (2011). *Origins of Serious Games.* 25-43. New York: Springer

Felten, P. (2013) Principles of Good Practice in SoTL. Teaching and Learning Inquiry

Hall, V. J. (2017). Exploring teacher-student interactions: communities of practice, ecological learning systems-or something else? *Journal of Further and Higher Education*, 41(2); 120-132

Hutchings, P., Huber, M., & Ciccone, A. (2011). *The Scholarship of Teaching and Learning Reconsidered*. San Francisco: Jossey-Bass

Kehler, A., Verwoord, R., & Smith, H. (2017) We are the Process: Reflections on the Underestimation of Power in Students as Partners in Practice International Journal for Students as Partners 1 (1)

Mercer, T., Kythreotis, A., Lambert,C., & Hughes, G. (2011) "Student-led research training within the PhD: “PhD experience” conferences", International Journal for

Researcher Development, 2 Issue: 2, pp.152-166, https://doi.org/10.1108/17597511111212736

Prescott, J., Iliff, P., & Cross, D. (2020). Co-Creating real-world research skills. *International Journal of Students as Partners*, 4(1) 120-127 https://doi.org/10.15173/ijsap.v4i1.3716

Prescott, J., Iliff, P., Edmonson, D., & Cross, D. (2019) Students as co-creators of a Mobile app to enhance learning and teaching in HE. *Mobile Technologies in Educational Organizations* Eds Baruch, A, F & Tal, H M. Hershey, New York, IGI Global. Chapter 6 Pages 96-116. ISBN: 9781522581062.

Tinto, V. (2000) Reconstructing the first year of college, in Student Support Services Model Retention Strategies for Two-year Colleges, Washington DC: Council for Opportunity in Education

Society of Teaching and Learning in HE (n.d). What is SOTL? Retrieved from: https://www.stlhe.ca/sotl/what-is-sotl/