

<b>ABOUT THE PROJECT</b>
<b>Title:</b> Student-Centered Learning: Using evidence-based practice to help students manage their learning
<b>Author(s)</b> Porter, I., Keenan, M., Gallagher, S., & Bones, R.
<b>Contact Details</b> Faculty of Life and Health Sciences, School of Psychology, Ulster University, Coleraine Prof. M. Keenan: Email: m.keenan@ulster.ac.uk Tel: 02870124283
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<b>OVERVIEW</b>
<b>Overview, Aims and Context</b> <p>Based on the CHERP 2015 conference, there are ongoing developments towards more interactive pedagogic approaches demanding more small-group teaching in flexible spaces. As the focus centers more on the student learning experience, this leads to more opportunities for using a greater range of flexible learning environments, with more interactive, informal and social types of learning. Included within this partnership, the Learning Landscape Transition Project aims to address the wider strategic goal for Learning, Teaching and Student Experience (<a href="#">Learning Landscapes - Centre for Higher Education Research &amp; Practice</a>). Learning spaces should be <i>'student-centered' rather than 'teacher-centered'; have the necessary technology to meet student and subject needs; support pedagogic, multidisciplinary, multimedia formats that engage students and are flexible, ergonomically comfortable, functional and multi-usable (CHERP, 2016)</i>. In addition The Ulster University's recently published Learning and Teaching Strategy cites its aims and intent as to enhance the student experience through the provision of well-designed, flexible, inclusive, relevant and accessible programmes and curricula that promote student engagement and success (<a href="#">Learning and Teaching Strategy</a>).</p> <p>This transformation in education is moving from an instructor-centred approach to a more learner/student-centred focus. However, although there is this transformation to a more student-centred focus, the question of how to positively effect this has not been adequately examined in the existing literature (Gabrielle, 2003). Student-centred learning environments are most often characterized as students being active participants who are intellectually engaged in course topics rather than passive listeners (LoPresto &amp; Slater, 2016). Student-centred strategies are certainly not new, there has long been an abundance of education research supporting the effectiveness of such approaches; however, active learning approaches are not widespread (Adams &amp; Slater, 2002; Bonwell &amp; Eison, 1991; Singer, Nielsen &amp; Schweingruber, 2012). The positive correlation between increased student participation during instruction and improved learning outcomes is one of the most consistent, robust findings of educational</p>

research over the past 40 years (Heward & Wood 2015). Decades of research have revealed and underscored the positive relationship between students' active engagement with academic tasks and their achievement (see reviews by Ellis, Worthington, & Larkin, 1994; Hattie, 2009; Swanson & Hoskyn, 2001). In more than one study, students who worked in groups showed significantly greater gains on conceptual questions than students who worked as individuals and there were many more positive than negative comments about working in groups (Adams & Slater, 2002; Gokhale, 1995).

In recent years, there has been increased attention to improving instruction in undergraduate courses across higher education institutes. Considerable criticism, summarised by Bok (2009) has been levelled at colleges and universities for not providing effective instruction that transforms students into productive members of society who have critical thinking skills across a variety of disciplines (LoPresto & Slater, 2016). However, it is a daunting task to satisfy the myriad learning and technological preferences of students in larger and larger classes. As a result, it becomes critical to understand how faculties can effectively meet the needs of a large and diverse student population without compromising the quality of teaching and student learning (Dean, Lee-Prost & Hapke, 2016). Lecturers can select from a plethora of different tool of various degrees of technological sophistication, conversely, it is uncertain how these tools can be combined and jointly used so that instructional design can be more thoughtfully made and the effectiveness of these tool maximised. However, few lecturers have the time to even give thought to how to change teaching strategies to keep up with the ever changing needs of students and the demands of those within academic leader ship.

Since the late 1800s and early 1900s many researchers, such as Ebbinghaus (1885), Skinner (1938) ([BF Skinner on Philosophy of Education](#)), and multitudinous others have investigated learning. These researchers have tried to identify and explain the process of learning through many different theories. Almost all of these theories have had published proven results and have been influential in enhancing the learning process. Throughout the history of Behaviour Analysis, learning was seen as an important field of study (Pear, 2016) and it now has a vast literature containing meticulously controlled experiments demonstrating effective, valuable techniques for behaviour change and the processes of learning (Moran, 2004). In fact, Behaviour Analysis is often defined as the science of learning (e.g. Colman, 2006; Gross, 2010). Inexplicably, though, behavioural techniques are rarely used within education settings; at best it is seen as effective within special needs education but offers little else. Despite much of the controversy over behavioural approaches to teaching the discipline of behaviour analysis has made significant contributions to pedagogy including direct teaching, the role of incentives and reward structures, the role of repetition and feedback, and the importance of clarifying learning objectives. Educational environments are designed to change an individual's behaviour, and the measure of the educator's impact is in the measureable change in the individual's behaviour (Moran, 2004). Behaviour Analytic researchers continue to explore how the principles of learning are relevant in today's technologically advanced learning environments ([A SCIENCE OF TEACHING](#)).

The aim of this research is to use what is already known about basic principles of behaviour to design a student-centered, active learning environment in order to enhance the student learning experience in a Psychology Statistics class. Teaching statistics has always been problematic and this project will provide

a good assessment of this model. Statistics teachers face many problems in teaching such a difficult subject area. According to Conners, McCown, and Roskos-Ewoldsen (1998), there are four main problems: variability in the performance of individuals, student motivation, anxiety about statistics, and making learning last. Behaviour Analytic approaches to teaching have a long history of success in overcoming these and other obstacles to learning.

In order to achieve the aim of this study, the method was loosely based on the principles of Precision Teaching (PT) (For reviews see: Beverley, Hughes, & Hastings, 2009; Kubina & Yurich, 2012; Lindsley, 1995) ([Precision Teaching and Learning](#)). The rationale for this was because PT is seen as a way to plan, use, and analyse a teaching style, method, or theoretical approach (Merbitz, Vieitez, Merbitz, & Pennypacker, 2004). Fluency training is often used within PT, as Binder (2003) stated “Fluency is the true definition of mastery or competence”. Fluency is doing things so fast that they become second nature and are performed without effort, without error, without distraction, and can be performed for longer periods of time with great resistance to forgetting (Lindsley, 1996). The goal of fluency training is to engage in a high rate of correct responses in a short amount of time (See Binder 1996; Brady and Kubina 2010; Johnson & Layng 1996; Péladeau, Forget, & Gagné, 2003; Singer-Dudek & Greer, 2005; Weiss 2001). One common method for increasing fluency is via the use of flashcards. Flashcards have been a popular self-testing strategy for students for many years. “Say All Fast a Minute Each Day Shuffled” (SAFMEDS) is one specific way that PT educators have used flashcards to explicitly promote fluent performance (Korinek & Wolking 1984) ([SAFMEDS Tutorial](#), [SAFMEDS Fluency](#)). Thus the students engaged in this project made use of flashcards and related activities during weekly hour long study sessions.

**Description** (a brief description of the activity; and how you have used innovative pedagogies and approaches in the curriculum design; max 200 words)

Students were asked to attend a study session each week where they were given that week’s SAFMEDS and encouraged to engage in an activity centred on using the SAFMEDS. Students were also encouraged to practice their SAFMEDS in their own time. This project made use of both a physical environment, using one of the new rooms in I Block, and a virtual learning environment via an app called Quizlet (See Appendix 1) ([Quizlet](#)) This app allowed for the designing of the flashcards and both online and offline practice. Each week students were given a set of SAFMEDS from that week’s lecture. They then tested themselves, via the SAFMEDs on the previous week’s flashcards and the new set of flashcards that they had just been given access to and ideally record their scores to compare with the following weeks scores. Students also engaged in various activities relating to either Quizlet or the SAFMEDS, for example ‘Quizlet live’ (See Appendix 2) or a matching task.

#### **Design**

This pilot study was, in essence, a field experiment, conducted during three one hour long study sessions each week. Students were assigned to one of three groups by the lecturer.

Initially, a within-group design was used. All students enrolled in PSY105 Psychology Research methods

were invited to attend, with a majority attending the first session, and been given access to the Quizlet flashcards. However, due to naturally occurring drop outs, the design would be more aptly described as a between-groups design, with one group attending more than four sessions, a second group attending either none of the sessions or two or less sessions. Finally, a third group emerged, those that attended the majority of sessions before a multiple choice test (MCT) was administered during week 6, but did not attend sessions thereafter, before the administration of a second multiple choice test (MCT) in week 9.

The assessment of learning consisted of the two MCTs, designed and distributed by the lecturer; the researchers had no access to these MCTs. The results gained from the MCTs were made available and mean scores from these MCTs were compared across groups. In addition, a survey was issued to the students regarding their thoughts on the study sessions and the use of SAFMEDS.

## **RESULTS**

### **Findings and Conclusions:**

Both a quantitative and a qualitative approach were taken in regards to data analysis.

The overall mean score for all students for MCT 1 was: 80.08

The overall mean score for all students for MCT 2 was: 68.84

The mean score for those who attended more than 4 sessions was: 78 (MCT1) 70.05 (MCT 2)

The mean score for those who attended less than 2 or 0 sessions was: 77.46 (MCT1) 63.21 (MCT2)

An interesting group emerged during the course of the research, students who attended the first sessions preceding MCT 1 but then did not attend the sessions after this. The mean scores for this group was:

The mean score for those who attended the sessions was: 83.73

The mean score for those who did not attend the sessions was: 67.81

It should be noted that these descriptive statistics should be interpreted with caution as there were some limitations to data collection that will be discussed later.

In regards to the qualitative data collection, a short survey (See Appendix 3) was issued randomly to some of the students enrolled in the class, including those that attended some, all, or none of the sessions.

When students were asked to identify the strengths of using SAFMEDS, the main strength cited was that SAFMEDS made remembering and recalling the terms and definitions easier. Several students also stated

that through using SAFMEDS they were able to know straight away if they knew the information or not and were able to keep up to date with revision. Finally the majority of students also stated that SAFMEDS was a fun, quick and easy way to learn.

Students where asked what they enjoyed most about the class, the majority of students cited that the class was fun, interactive, friendly, and interesting. Students also stated that they enjoyed the gamification of learning, working in groups and they really enjoyed learning the various ways of learning. In addition, students also said that it prepared them for their MCTs. Finally some students also said that they were happy their feedback and suggests where taken into account when considering the following weeks activities.

When asked if they would like more classes like this to run, all students who attended the sessions agreed that they would, they also added suggestions for improvement, this suggestions where that they classes should aim to encompass all modules and not just concentrate on one module.

Of the 30 students surveyed who attended the sessions, 28 agreed that their study skills had improved through the use of SAFMEDS. In addition, 17 of those 30 students had started using SAFMEDS for other modules and 11 students were considering using SAFMEDS in other modules. Those students who were already using the SAFMEDS in other modules had set up a Facebook group to share their SAFMEDS amongst themselves

## EVALUATION

**Reflective Commentary** (this should draw from your experience and identify what worked well and what were the key challenges)

From the results it can be seen that the value of using SAFMEDS is evident, the students enjoyed the classes and where actively engaged in the tasks set. Students gained confidence in their understanding of the terminology used within research methods, further self-study was encouraged and adopted as the method was so quick and easy to use, this is shown by the students' generalisation of the SAFMEDS created by the students themselves to other classes. This study suggests that short practice sessions, targeting fluency rather than percentage correct, can offer an effective, inexpensive, and easily administered technique to engage students. The initial creation of the flashcards may take some time and effort; however, once they are completed they can be used over and over with minimal effort needed to update them. The findings of this brief study highlight student support for this method of learning statistics and research methods terminology, is easy to implement, does not require specialized equipment, and it is not costly in terms of time or other resources.

To reaffirm the aims of the CHERP projects, it has been demonstrated that this method of using SAFMEDS has fulfilled the necessary criteria; it is student-centered rather than teacher-centered, the necessary technology is already there to meet student and subject needs, it supports multidisciplinary, multimedia formats, it is flexible, functional, and multi-usable, and finally it engaged students in active learning.

However, as with any pilot study conducted in real world settings there are several limitations. As this was a field experiment, there was very little experimental control due to the balance that the researchers were striving to achieve between running a research study whilst still enabling the students. Dropout rates were a significant problem, this could possibly be circumvented if more formality was given to attendance of the classes, it could also be considered that students would gain some form of credit for attending and engaging in the classes to help increase attendance.

In this study the daily use of the SAFMEDS could not be monitored, due to a lack of resources, there was a reliance on self-reports, and this was only gained from those students who attended the classes. Nor was it possible to monitor the time spent by each student engaging with the app and/or self-made SAFMEDS. For example, one student, in the week leading up to MCT1 had “used the app, I think, probably, hundreds of times” but in the week after the MCT had not used the app at all, as he was studying for a test in a different module.

In future, the researchers would like to make significant changes to the methods employed in this study. More formality should be given to the attendance of the classes. The design and development of a custom-made app would allow for the collection of data that was not possible to collect within this study, and this would allow for a more meaningful analysis of the data. The addition of a follow up test at a later stage would solidify the findings that the use of SAFMEDS aids a deeper learning and retention. Finally, using these study sessions to engage students with the materials from more modules would be a significant benefit and may encourage participation.

As this research took place in a real world setting, and empowered students to be the main instigators of their study sessions, it lacked the control that could be achieved with a more rigorous experimental design. However, the students in this study have shown a resounding approval of the use of SAFMEDS. It was clear that aiming for fluent performance was fun and it engaged the students. Often laughter was heard either during the games or when comparing fluency scores after a timing session.

In conclusion, the benefits of using established behavioural methods for maximizing learning can be repeatedly demonstrated across a variety of learners, settings, and disciplines; and that the benefits are lasting; it can be easily implemented and maintained. This study appears to have checked those boxes even though the circumstances were not entirely favorable.

**Student Engagement (to be completed by the student partner):** Impact on learning experience and sense of belonging;

I found the quizlet app very beneficial, the fact that I was able to use it on a mobile device, allowed for regular use. Using flashcards meant that it was easier to memorize terms and definitions as we were and learning them in blocks, breaking the information down into smaller blocks made it easier to understand absorb the information better and quicker.

The Self-testing aspect of the app and in class was very beneficial, as it allowed for the examination of progress.

Having the additional study class really encouraged further use of flashcards, as you wanted to improve on your performance each week and this constant learning helped in regards to writing reports and essays

The classes were really fun, as it was informal learning and allowed for discussions to take place, discussions I didn't feel alone in my studies, and it was encouraging to compare progress with peers. It also stopped me from feeling stupid or that I didn't know enough, as learning the terminology was like learning a new language, and I think I would have found it really difficult without the classes and flashcards.

My only suggest for improvement would maybe have more formality in the structure of the classes, as sometimes not everyone was concentrating on the task, I would like to have seen my progress charted via the app.

I really hope these classes continue, as I don't think I appreciated them enough when they were running and I missed the class when it wasn't running during my second semester. I really think these classes offer a lot of advantages to first year students, not only to help improve learning to to help with a sense of belonging and friendship.

(Dean Reid, First Year Psychology Student, Coleraine Campus)

**Learning Environment and Engagement:** your views on the appropriateness and effectiveness of physical spaces for engagement and virtual spaces to enhance learning.

The rooms in I block suited perfectly for this type of activity, the only improvement that can be suggested would be for a stronger Wi-Fi connection as sometimes the students could not connect to the university network and this lead to the researcher having to reorganise the planned activity at short notice.

In regards to the virtual learning environment, whilst Quizlet is an impressive app, allowing for quick and easy access to the flashcards, there was no option for monitoring how often the students were using it or for how long. It would be easy to develop an app that overcomes these limitations

**Impact** (please provide evidence of the impact on learning and/or teaching)

(See Appendix 4 for survey results)

## STRATEGIC DEVELOPMENT

**Transferability** (consider how this activity might be used by colleagues in other schools/faculties and if it could be developed for a further Faculty interdisciplinary learning project)

This activity can very easily be used and adapted by other schools and faculties, as stated earlier, once the initial set up of the flashcards has been completed, any given topic, from languages to computer science, can benefit from the use of SAFMEDS

The approach is very easy to implement with minimal training of staff members and would be quick and easy to either inset into the lecture format or, as in this case, a series of study sessions designed and run alongside the corresponding lectures.

To further encourage the use of this method, a university specific app could be designed and distributed to lecturers at a minimal cost to the university.

**Dissemination (internal and external)** (School and Faculty briefings, workshops, resources developed)

#### **SUPPORTING INFORMATION**

**References** (using Harvard style, list literature and other resources that influenced your work)

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**Attachments List and** attach relevant documents/images in support of project activities

See Appendix 5 for photos)