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A randomised control study about the effects of different assessment registration encouragements

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Abstract: Despite their potential to robustly evaluate the effects of educational interventions, Randomised Control Trials (RCTs) in education, particularly in assessment and evaluation in blended or distance learning studies, are scarce. This proposal reports the implementation of a RCT to evaluate the effectiveness of a short-scale intervention (i.e., motivational encouragement) which aimed to improve students' attendance of final exam, completion and pass rates in four online language courses. Results revealed that the specific intervention was not adequate to improve students' performance and attendance. More studies are needed to identify the types of interventions that would elicit positive learning outcomes. To assist practitioners with the implementation of RCTs in education, a learning analytics framework (Analytics4Action Evaluation Framework) is described.

Introduction

Randomised Control Trials (RCTs) are a type of evidence-based research approach in which participants are randomly allocated to different treatment conditions. Although widely used in other fields, RCTs have not been extensively adopted in educational research and learning analytics (Hess & Saxberg, 2013; McMillan & Schumacher, 2014) more likely due to ethical, social and financial concerns expressed by educators and students (MacNeill, Campbell, & Hawksey, 2014; Slavin, 2008). In particular, RCTs in assessment and evaluation practices (Price, Carroll, O'Donovan, & Rust, 2010) could effectively assess the positive or negative effect(s) of the experimental condition(s) relative to the control condition (Siroker & Koomen, 2013; Slavin, 2008) and conclude on whether an intervention should be further adopted or abandoned. RCT intervention studies in higher education showed that even small changes can have a positive impact on learning. For example, changes in students' enrollment procedures led to stronger and more learning links in the experimental group (Hommes et al., 2014). In another study, motivational emails sent to distance learning students in the experimental condition led to higher pass rates than the control condition (Inkelaar & Simpson, 2015). In terms of learning evaluation, three of four randomly allocated groups of fourth year medical students were provided with online formative assessment material aiming to stimulate learning. Although such materials are viewed as supportive of learning, outcomes of this RCT revealed poor use by students. Some form of encouragement such as materials' use in summative assessment might have elicited a more positive reaction by students (Palmer & Devitt, 2008).

The value of using RCTs in education has been recently recognized by major funding bodies such as the Educational Endowment Foundation, UK and the MIT's Poverty Action Lab, US, that have raised considerably large amounts of money to implement RCTs in the field of education (Harford, 2014). Despite their merits, it is acknowledged that in educational studies RCTs might require additional sources of data to adequately explain the impact of an intervention given the complexity of the teaching and learning processes. For example, a combination of qualitative and quantitative methods of data collection might be more appropriate to understand why an intervention specifically targeted on assessment and evaluation has a positive or negative impact or whether certain aspects of the intervention might be more or less effective than others.

Rationale: Proactive contact or interventions refer to the teaching or advisory team making contact with students in a proactive manner. Such interventions are important as they can reach students who are less likely to contact their tutor or student support team and hence they may be at greater risk of dropping out (Simpson, 2004). The early identification of students at risk of dropping out coupled with early and continuous proactive interventions may have a positive impact on retention rates. Visser (1999) sent short postal messages to students and found significant retention effects

irrespective of the length of the message and whether this was sent by teachers or the institution. Similar effects were reported for the use of telephone (Simpson, 2007). Little attempts have been made to collect comparative data about different types of interventions and validate the effectiveness of such interventions through robust methodological designs including RCTs.

Research questions: Research shows that students drop out at certain points: before the first teacher marked assessment (TMA), as the learning curve becomes steeper and before the final exam/end of module assignment (Simpson, 2013) In this study, participants were students studying level 1 intermediate language modules in French, German, Spanish and Italian at an open and distance learning institution. Towards the end of the module, students receive an email offering them a choice of when to attend their end of the year speaking assignment, which is conducted in a synchronous online setting. Students who do not pick one of the proposed timeslots, are allocated to a default session. It was hypothesised that students who did not choose their own, convenient date for taking the final speaking assignment and received a default session are the most at-risk of not attending the compulsory end of the module assignment and in consequence failing to complete the module. Not making a decision about the final assignment might indicate a lack of interest and intention to complete the module. Those students were provided with a support intervention aiming to motivate participation to the end of the module assignment and module completion.

Hypothesis 1: There will be no differences between intervention and control groups in terms of the end of the module attendance rates and performance.

Hypothesis 2: There will be no differences between intervention and control conditions in terms of passing the module.

Method

Three support interventions were designed to test these hypotheses: Experimental Condition 1 (EC1): students received an email message noting that a respective student had not actively selected the end of the module assessment slot and reminding the student to choose an assessment date. EC2: students received an outbound call to check whether they were aware of the date and time of the end of the module assessment. EC3: an email was sent to the student's tutor drawing their attention to the fact that certain named student/s had not picked their end of the module session. Tutors were left to decide whether they should contact students and in what ways. EC4: The control condition received no additional action.

Participants

The sample of this study was 80 students who were given a "default allocation" for attending the end of the module assessment. Seven students in EC2 were not included in the analysis as they could not be reached through phone. The final sample size was 73 students. Participants were mixed, put into a unique student number order and allocated to one of the intervention or control conditions.

Results

In terms of gender, 47.9% (N = 35) were male and 52.1% (N = 38) were female. The majority of students (43.8%) was in the age band 17 to 30 years old, 31.5% between 31 to 45 years old, and 24.7% between 46 to 76 years old. A great majority of students completed the end of the module exam (N = 64, 87.7%) and managed to pass the module (N = 60, 82.2%). A one-way ANOVA was performed to examine differences between conditions in relation to the end of the module exam. No significant effect of support intervention on students' end of the module performance was found ($F(3, 68) = 0.89$, $p = .45$, NS). A chi-square test of independence was performed to examine whether the support intervention had an impact on the number of students attending the end of the module examination. No statistically significant differences were found between the four conditions ($\chi^2(3, N = 73) = 3.1$, $p = .37$, NS). A chi-square test of independence was also performed to evaluate differences between conditions in passing the module. No relationships were found between the four conditions and pass/failure conditions ($\chi^2(3, N = 73) = 5.0$, $p = .17$, NS).

Overall, no significant differences between the three intervention types and control condition in relation to support provided to at-risk students before the end of the module assessment was found. Given the higher end of the module mean scores (see Table 1), it could be argued that the first two interventions (email and outbound calls) were more effective than the third intervention (email sent to

tutors). Yet, none of the three types of intervention was found to have an impact on the end of the module assessment, attendance, and module completion compared to the control condition.

	TMA1	TMA2	TMA3	TMA4	Final exam	# passed	% passed
Condition 1	79.3	77.0	79.2	72.8	69.8	17/20	85.0
Condition 2	79.1	70.5	75.3	72.4	67.5	13/13	100.0
Condition 3	82.9	77.2	75.0	74.7	55.1	14/20	70.0
Condition 4	80.5	76.6	78.0	77.2	67.5	16/20	80.0

Table 1 Mean scores in 4 TMAs, final exam, and percentage of students at-risk passing the module.

Discussion

It is not yet clear what type of interventions should be designed and how to effectively support distance learners at-risk of failing or dropping out, in particular to encourage students to register for the final assessment. This study is an example of how RCTs might be used in open and distance education to effectively test the impact of different interventions on learning. Reasons that might explain the lack of impact in this study might be the short time duration of the study, the relatively small intervention and the fact that a small reminder might not be sufficient to change students' intentions.

The Analytics4Action Evaluation Framework (A4AEF) is a framework developed at the Open University UK to help practitioners conduct evidence-based research in distance learning. The A4AEF makes extensive use of RCTs to evaluate the impact of certain learning analytics interventions which aim to improve students' retention rates and performance. Figure 1 illustrates the A4AEF and how students, researchers, educators, and policy makers can evaluate and decide on the types of interventions that work well and the conditions under which this can be achieved. The A4AEF consists of six key steps: involved stakeholders examine learning analytics data from VLE and other systems (1), a number of possible interventions that could improve a module are presented to stakeholders (2), educators decide on how to examine the impact of the selected intervention (e.g., using RCTs) (3), and determine the impact of the respective intervention in relation to specific key variables such as learning objectives (4), evidence are shared at an institutional level (5), and compared with other interventions across a range of modules from various disciplines (6) leading to improvements in key metrics (see 1).

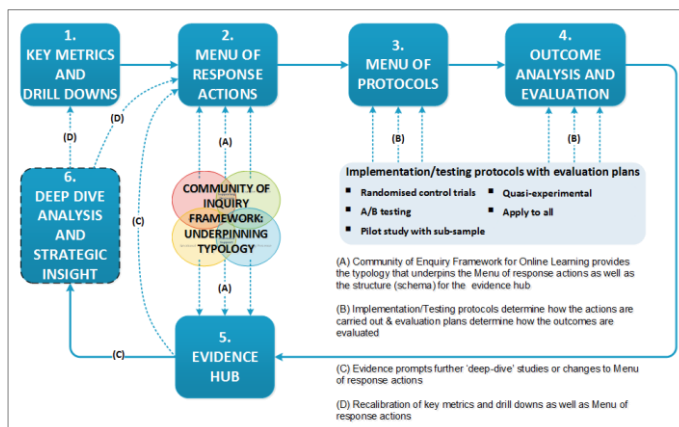


Figure 1 Analytics4Action Evaluation Framework. Source: (Author A, 2016b)

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