Expanding Learning Scenarios
Opening Out the Educational Landscape
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MASTERING THE BLEND: STUDENTS' VALUE OF CLASSROOM AND ONLINE COMPONENTS IN A BLENDED ACCOUNTING COURSE

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Introduction

A top-scoring student dreams of becoming a chartered accountant, one of the most prestigious professions around. He is selected and enrols for one of the most challenging programmes at one of a few universities that offer this degree. At the end of his first year he fails financial accounting, the subject that he has to pass through all his years of study as the cornerstone of his career. It is a devastating blow, and it will probably derail his future, as well as erode the reputation of the institution with the professional body, as in four years fewer professionals will be delivered to industry.

In higher education, improved outcomes and throughput rates are rigorously pursued, particularly in high-stakes subjects like the one failed by our unfortunate student. While massive investments are made into learning with technology in blended learning mode, the promised benefits seldom materialise. Merely using computer technology in teaching situations where the pedagogy remained the same has been shown not to improve learning outcomes (the no significant difference phenomenon) in study after study (Russell, 1999). A meta-analysis (Means, Toyama, Murphy, Bakia & Jones, 2009) has, however, found that recent students in blended learning mode did outperform their equivalents in traditional classrooms. They attributed this to blended learning students spending more time on their studies. In order to improve student success in pivotal courses, the promise of technology needs to be harvested, and blended learning unpacked and redesigned in a way that provides every student an excellent chance of success. There is a call for coordinated design research on how particular sections of the "blend" add particular value to learning (Roscorla, 2014).

Literature

In order to implement blended learning in a more effective way, the way students use different components need to be scrutinised. While descriptions of the characteristics and performance of blended learning practically do not exist, its definitions are criticized by prominent academics (Roscorla, 2014) as being narrow and one-dimensional. Blended and hybrid learning is defined by the Online Learning Consortium according to the amount of classroom time that is replaced by online activity while adding value (Mayadas & Miller, 2014). In practice, many so-called blended classrooms do not fit this definition of blended or hybrid, as

online activities do not replace any classroom time nor require meaningful out-of-class online learning, and can best be described as technology-enhanced classes. Researchers also found that adding technology to existing courses without concomitant changes in pedagogy resulted in no significant differences in student outcomes (Russell, 1999). The meta-analysis by Means and her team (2009) suggested that the improved outcomes in a blended environment compared to traditional classes were mainly due to students spending more time on their studies. The Garrison and Kanuka approach to blended learning of "the thoughtful integration of classroom face-to-face experiences with online learning experiences" (2004, p.96), where the emphasis is on integrating the strengths of activities from the two main delivery modes, remains valid. The core attribute of blended learning should be to improve the quality of student learning. Picciano (2009) proposes that blended learning can accommodate students with diverse needs, intelligences, personality types and learning styles. He calls for a purposeful blend of classroom and online activities informed by pedagogy that is driven by the course goals and objectives.

The biggest contribution to improving student outcomes is the work of Benjamin Bloom (1984). Inspired by tutoring, he showed a two sigma improvement on average in student outcomes after providing personalised corrective feedback in the areas where students had not mastered the requisite concepts or skills. The resultant Mastery learning process (Guskey, 2009), has been consistently successful in tutoring students in subjects such as mathematics. This approach translated well to computers as tutors, becoming an effective instructional aid. Programmes following individual differentiated learning paths show impressive learning gains and successfully reduce the achievement gap. While suitable programmes are not necessarily available, HE educators can still apply the principles of mastery learning to good effect in blended learning courses.

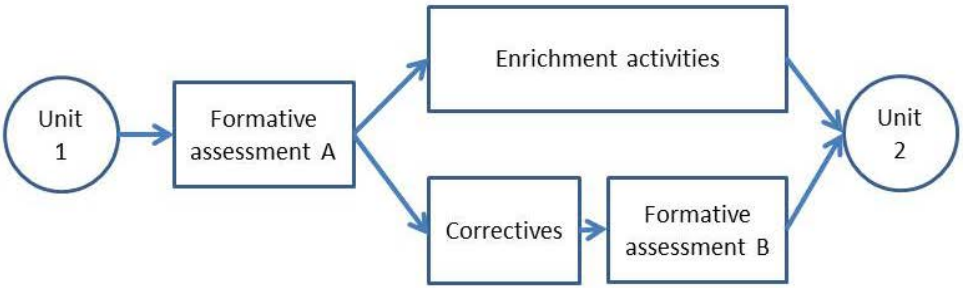

Figure 1. The mastery learning process (Guskey, 2009)

Addressing under-achievement in higher education is complex as students self-manage their time and learning activities outside class. Goda and co-workers (2015) confirmed that students' e-learning habits significantly influence their ultimate learning outcomes. Students who are in the habit of procrastinating have significantly lower scores than those with a learning habit (Goda et al., 2015). It is therefore suggested that a course which nudges students into more timely study habits could improve their grades. A mastery learning approach would encourage students to engage with the work on a regular basis.

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In spite of promises of blended learning being personalised, there is little research on how the blend of delivery modes actually tap into the way students construct knowledge. In order to compile the most successful blend of delivery modes for each learning component, designers should also take into account students' preferences. In a large study that cut across several disciplines, Paechter and Maier (2010) found that students preferred the online environment for practicing the skills of their subject and monitoring their own learning processes. They preferred the face to face environment for acquiring new skills and concepts and application of knowledge. The researchers also found that lecturer characteristics were among the few factors contributing to overall satisfaction with courses. High quality teaching material and students' attainment of expertise likewise added to their satisfaction.

Context

Financial Accounting was a pivotal module in the studies of chartered accounting first-year students and challenged even the brightest students, due to the high standards set by the professional body, SAICA. In the first year, students were selected on a high matriculation subminimum in one of the two languages of instruction at the University, as well as in Mathematics. Of the 570 students in the 2014 cohort, 130 had not taken Accounting as a school subject, and received supplemental instruction in order to complete both the school and university syllabi in one year.

Research had shown that students underestimated the importance of theory in the first year, which contributed to poor marks. In 2011 a mastery learning process (Guskey, 2009) was adopted in a blended learning approach, as the objective was to reduce the achievement gap of students who did not have accounting at school. Ten minute formative online quizzes were deployed in the LMS (Blackboard Learn™). These quizzes addressed the content of the past week or two's theory and focused on known misconceptions and troublesome concepts. Each question had feedback in non-technical terms to benefit the students who were unfamiliar with the terminology. The test which was available for a week, offered students a second chance in a batch of questions from an extensive question pool. Afterwards staff viewed the item analysis of all questions to identify concepts for re-teaching and further explanation in class. From the first implementation, the quizzes proved immensely beneficial, improving the pass rate to the same level as the students who had taken the subject at school (Nagel & van Eck, 2012). Students had to complete a minimum number of quizzes that contributed to their year mark. The quizzes were then extended to the whole class in the following year.

Supportive documents including administrative resources and sample questions and answers from multiple sources were provided in the LMS to coincide with current lecture topics. Some resources supported homework and preparation for classroom discussions, and formed an integral part of the expected learning process. Others provided enrichment and extra practice.

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The research question of this paper is:

- How do different components of the "blend" contribute to student success?

The sub-questions are the following:

- What are the benefits of formative online tests?
- What is the value of providing supplemental online learning material?
- Which lecturer characteristics are most valued in the blended environment?

Methodology

A mixed methods approach consisting of questionnaires with itemised and open-ended questions was followed. In the Blackboard Learn™ LMS, the annual diagnostic end-of-class survey about the online quizzes was deployed with most questions probing the logistics of the quizzes like frequency, number of questions, difficulty, type and value of feedback. The LMS survey was completed by 333 students (57.6% response rate) and initial data were captured from the item analyses, and refined in Microsoft Excel™, comparing the frequency of the three response options across the six questions that dealt with the learning aspects of quizzes.

The second survey probing the usefulness of the other online activities and resources, as well as students' experience of the lecturer in the classroom, was deployed after the last exam. As students were not on campus anymore, the link to the combined survey, which was hosted on Qualtrics©, was distributed via an announcement from the LMS to email so students could complete the questions on any device, like smart phones. This questionnaire was completed by 316 students (55% response). Responses to the itemised questions in Qualtrics© were drilled down according to students' year -mark and compiled into contingency tables. Due to few responses from students who achieved less than 50, the cut-off point for pass or failure, all failing student response categories were collapsed into one. Chi-square analysis was performed on the contingency tables using the Social Science Statistics© website (Stangroom, n.d.). Replies to open-ended questions provided triangulation and context.

Table 1: Response profile by student year mark

Year mark	<50%	50-59%	60-69%	>70%
Response rate as % of achievement category	40	63	60	72

Table 1 shows that responses from failing students <50% were scarce while students with high marks >70% responded more readily. Considering that there was no reward for completing the surveys, we concluded that the high-achievement students were more motivated to respond than the others, illustrating that mastering knowledge likely motivates and satisfies students (Paechter & Maier, 2010).

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Findings and Discussion

Online quizzes with feedback

We first analysed the online components of the "blend" in order to find out what value they contributed to learning. All students had access to the on-campus computer laboratories (results not shown), and experienced no barriers to completing the online quizzes. We report on the six questions about learning engagement with the quizzes that were selected from the LMS survey and probed the benefit thereof.

The pervasive success of the online quizzes in their present format is evident in the response to the first question in Figure 2, showing that nearly 70% of the respondents found the quizzes straightforward beneficial, and when added to the numbers to whom they were at least some of the time beneficial, 98.5% of the class benefitted from this activity. Drilling down into the detail, the metacognitive value of the quizzes were evident in replies to question 2, as a resource that confirmed for 67% how well they knew the work, and sometimes for another nearly 30% of students. The quizzes helped more than 55% of students to learn the subject (question 3), by focusing on the important aspects and helping them manage their time better (explanation from open-ended responses), an aspect that was sometimes true for another 42% of students.

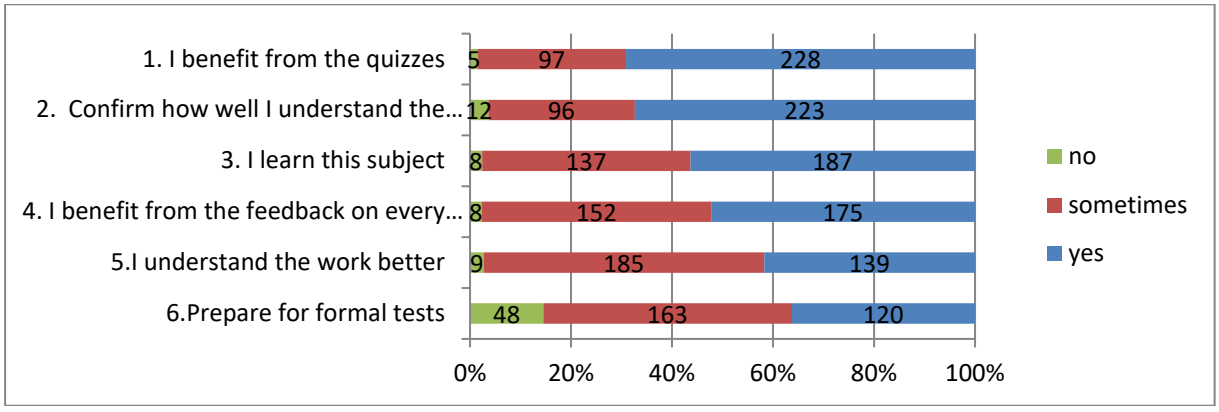

Figure 2. Student responses on what the online quizzes help them with (in %)

About half the respondents thought that the feedback in the questions helped them (question 4), while the other half only sometimes found the feedback beneficial and only 2.4% did not benefit from feedback. This finding is consistent with Bloom's mastery learning theory (Guskey, 2009), that students who perform well on their first attempt at the assessment demonstrated that they had mastered the unit concepts, and did not need correction. The feedback (question 5) feedback was indispensable to understanding the work better for nearly 42% of the students, while it sometimes helped 56% of the respondents. Quizzes showed students which specific topics in the online resources to study further. Overall, online quizzes contributed strongly towards understanding the work and less to preparation for formal tests, true to their formative nature. Their most pervasive value was in monitoring students' own progress, which is consistent with findings by Paechter and Maier (2010), whose students also preferred the online environment for monitoring their own learning. Formative assessments

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helped in diagnosing areas that needed attention early on and keeping students up to date (open-ended responses), all consistent with mastery learning objectives (Guskey, 2009).

Online resources

We probed the usefulness of numerous other online resources that supplement and support the curriculum and help students understand the subject, in addition to the formal lectures. Students engaged with these resources in their own time. For this discussion the questions were grouped according to resources that would help students prepare for formal summative activities and those that supported understanding and learning. We calculated the average response regarding the usefulness of the 4 resources that help prepare for summative assessment, as well as those 4 that helped with understanding the work.

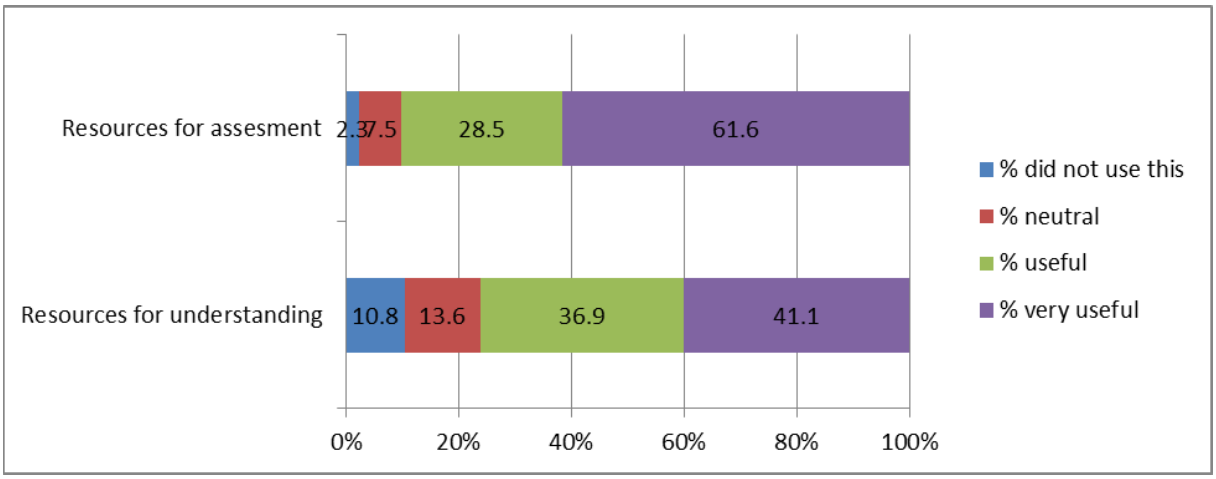

Figure 3. % students who found online resources for understanding and for assessment useful

Over 61% of respondents found the resources that were perceived to help them prepare for summative assessment very useful. The online resources that were directly associated with summative assessment, included: the answers to the questions in the prescribed text book, the availability of test papers and memoranda after tests, publication of the scope of tests and exams and online notices and announcements. 90.1% of the students found those resources useful or very useful.

Online resources that were reported to contribute to understanding and learning included the following: Summaries and explanations of topics, homework to prepare for lectures or work sessions, extra questions and answers based on questions asked by students in the classroom and extra questions and answers from old text books. Only 41.1% of respondents found the resources relating to understanding very useful, with 36.9% finding them moderately useful. These resources enriched and extended learning experiences, after students had feedback from the quizzes on where their knowledge gaps were. While 78% of the respondents found these resources useful to any extent, it was significantly less than the resources helping with summative assessment (90.1%). The real value of online resources were in preparing for summative assessment, as they provided enrichment and extra practice in a subject where

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accuracy and speed are important skills, confirming findings by Paechter and Maier (2010), that students prefer online opportunities for practice and application of knowledge.

Lecturer characteristics

From the questions on lecturer characteristics and how they were valued by these students, we discuss the two that relate directly to preparing for tests and exams, and four that describe how lecturers help students understand the work, and calculated the average response for all the questions in each group.

Table 2: Lecturer characteristics: value of teaching for understanding and assessment

% responses	unimportant	neutral	important	very important	extremely important
For understanding	0.6	1.8	14.1	33.3	50.2
For assessment	0.6	2.6	21.2	31.7	43.9

Responses of the group as a whole (Table 2) showed that teaching for understanding was significantly more valuable than helping students prepare for assessment. When the responses were broken down into performance brackets, summative assessment was found to be of equal importance to students across all levels of competence, P-value = 0.883027. The value of teaching for understanding, as shown in Figure 4, showed a significant association with performance.

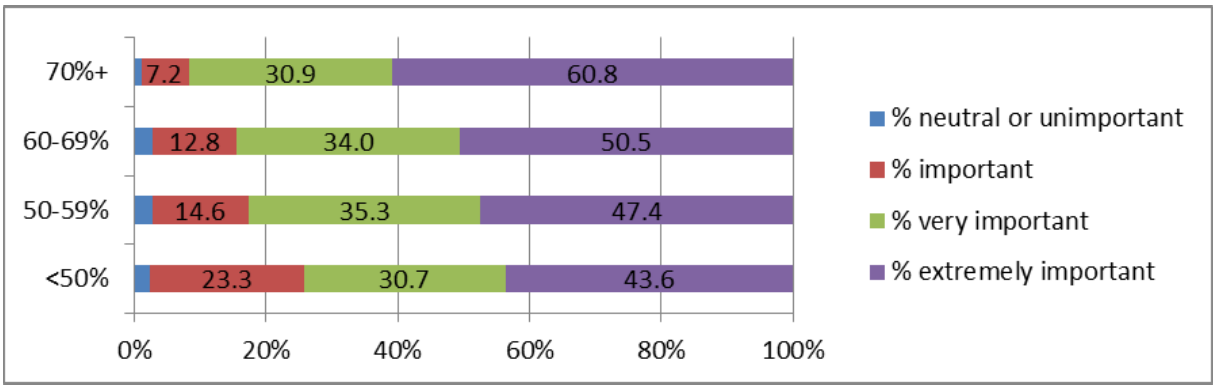

Figure 4. Distribution of responses to three questions about teaching for understanding among students with different levels of achievement

Figure 4 shows that the higher the students' marks, the more they valued their teacher's ability to help them understand the work. While this is shared by all, the degree of importance increases with increasing grades. These differences are highly significant at $p < 0.01$. (Chi-square statistic is 24.9247, $P = 0.003056$). Ross and Bell (2007) suggested that students achieved higher order (abstraction and application) outcomes better through contact instruction, whereas the cognitively lower order outcomes were equally well achieved using computer-based and contact instruction.

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Conclusions

In HE students manage their own time, activities and online resources. Three aspects that contribute to satisfaction and motivation in blended courses namely lecturer characteristics, students' mastery of outcomes and quality online resources (Paechter & Maier, 2010) are shown here to be positively associated with student performance. A mastery learning approach contributed positively towards narrowing the achievement gap in a high-stakes and challenging course with outcomes in the cognitive domain (theory) and skills domain (analysis and calculation). As a self-paced activity, the majority of students intuitively valued formative assessments for the intended purpose namely understanding key concepts and staying up to date. Online resources that helped with administrative issues and organising and preparing for assessment were most highly valued. Online resources that provided examples and practice were used before a second attempt at quizzes and to prepare for summative assessment. The classroom component of the blend was most highly valued specifically for the teaching characteristics of the lecturer in explaining new and difficult theory, but there was a highly significant difference in the value that higher versus lower achievers placed on this characteristic, with the value of increasing with grades. There was no significant difference in how high and low achievers valued the lecturer's effort that prepared them for summative assessment.

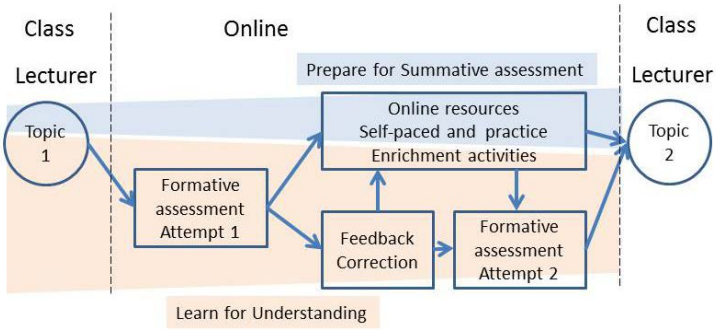

Figure 5. Proposed model for implementing mastery learning in a blended environment

We propose the following model, derived from mastery learning for similar subjects (Figure 5): For understanding new work students prefer the classroom and a teacher who explains theory and concepts well. The higher the student's own standards, the more they value this expertise. The next step is to monitor understanding, for which students prefer online formative assessment that explains misconceptions and shows gaps in knowledge, for which online resources are used. Thirdly, students value lecturers that help them prepare for tests, but they also prefer to use high quality online resources to practice and exercise their skills before tests and exams. Our findings illustrate the integrated way that students prefer to learn, moving between contact to online environments for preferred activities.

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