A quest to tame the beast: Involving eLearning and social media to improve Accessibility, Flexibility and Equity

Foundation and Bridging education providers constantly rethink their ways of thinking and doing in a quest to provide improved opportunities for more students to take up further studies and to assist them to persevere long enough to complete their qualifications.

Providers are unable to remove barriers like under-preparedness, low prior educational success, socio-economic- and family circumstances and commitments. Providers can however try to improve accessibility, flexibility and equity by removing procedural barriers set up by themselves. The modes and timing of delivery, dialogue and assessment are major issues over which providers have large degrees of control.

The level 3 (L3) Health science course prepares students for the level 4 Anatomy and Physiology and Bioscience courses which in turn prepare students for the science courses in the Nursing degree and other Health related courses.

In 2014 a process to change the delivery model to a blended design started. This was an attempt to tame the hardly manageable “beastly” labour-intensive course that evolved over time while simultaneously improving its accessibility, flexibility and equitability for students. This course currently uses two online periods per week (preferably on-campus), one lab period and one face-to-face period.

Flexibility was improved by allowing students the freedom to control their own learning processes by pacing themselves within set time limits. Suitable online resources were selected, developed (like eBooks and computer-marked formative assessments for all assessment criteria) and organised around course outcomes. Online summative assessments could be done asynchronously in class when students were ready. This allowed success, for example, for students with temporary family duties. Up to 28% of the students in some classes were without home computer internet access. Measures to deal with these accessibility and equitability issues included the use of social media.

This presentation explains the finer details regarding the processes of improving the accessibility, flexibility and equitability for students while making the course easier to manage and deliver. Results of questionnaires and surveys investigating student and lecturer experience are shared.

Since the traditional ways of thinking and doing are challenged by these new possibilities, numerous issues like a common understanding among lecturers of the use of asynchronous assessments and procedures for quality control need rethinking and adjustment.

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Introduction

Some factors that influence the retention and success of students, like under-preparedness, low prior educational success, socio-economic- and family circumstances and commitments, are outside the control of the education providers: Providers have a large degree of control over procedural barriers that they set up themselves such as course content, modes and timing of delivery, dialogue and assessment. Changing these procedures can improve accessibility, flexibility and equity for especially Foundation and Bridging students who often did not succeed in more conventional settings.

The topic of this study is the revision of the delivery mode for a project-based level 3 (L3) Foundation Science Health course at a NZ institute of Technology. L3 and Level 4 (L4) are two seventeen week university preparation certificate programmes which prepare students ultimately amongst others for Level 5, the first year of a bachelor degree in nursing.

The sixty credit programme currently consists of three courses: Project (thirty credits) and delivered within a science context, Literacy (fifteen credits) and Numeracy (fifteen credits). Since 2015 three lecturers, namely a Numeracy, Literacy and Science specialist are assigned per class.

The programme as a whole is organised around four projects as given in the table below. In the project part of the course each one of these projects is linked to a number of science competencies. (The competencies used in this course can be equated to outcomes each with a number of assessment criteria. They were set up by the School itself in consultation with the Destination courses like the School of Nursing).

Table 1: L3 Course outline

Projects	1. A future in Healthcare	2. Nutrition and Mobility	3. Infection	4. Holistic care	
Time allocation	4 weeks	5 weeks	4 weeks	4 weeks	17 weeks
Number of competencies	5	6	3	2	16
Competencies assessed throughout	Lab skills Lab report writing				2
	Total number of competencies				18
Students need to pass thirteen of the eigtheen competencies in order to pass the science					

Between forty and eighty students enrol in the L3 programme per semester. Their placement is based on their prior educational results and a diagnostic test that assesses their Numeracy and Literacy skills. The demographics of the cohort vary from intake to intake, but in a cohort reported on in this paper, ninety percent of the students were female. Approximately half of the female students were mothers of pre-school of primary school children (43% of a cohort or 38).

The students in this programme mostly did not do any science in school, but decided later to pursue studies in Health and/or need upskilling in Numeracy and Literacy within a Health context. The main objectives of the L3 programme are to equip students with the necessary fundamental content knowledge, abilities to work in teams and self-management in an academic milieu and skills that they would need on L4 (and beyond) in Health pathways.

The project course (Science) evolved over a number of years with valuable inputs from the multitude of lecturers that were involved in it. By 2014 however this course presented a huge challenge regarding procedural barriers and philosophical underpinnings. It appeared as if there were fundamental philosophical non-alignments: the course delivery aspired to be constructivist in

nature while the science assessments were all mainly behaviouristic in nature (Mergel, 1998; Ertmer & Newby, 2013), focused on recall. The history behind this situation was compiled from anecdotal evidence: after adoption of the project-based learning model a few years prior to 2014, a number of lecturers (up to eight) was assigned per class in order to assist the students in doing their projects. Lecturers assessed the outcomes using rubrics and marking schedules from project tasks that the students compiled in groups and individually using a wide variety of resources. Disillusionment followed when inconsistencies across classes led to a lack of trust in the assessment procedures and results and low performance of L4 students coming from L3 was assumed to be linked to a lack in rigorous and consistent assessment in L3. Good results in L4 (65% in all their courses) are essential for entrance into the Nursing degree.

In order to deal with these challenges, rigid assessment procedures and rules were set up: an era of tightening up and coordination of all efforts followed. All classes were expected to do the same assessments in the same week using the same assessment instruments (tests called checkpoints), testing achievement of every assessment criterion of every competency. Students had to achieve a stated number of assessment criteria for every competency in order to achieve (A) or more to gain merit (M). Students took the checkpoints home after they were marked so that new checkpoints were developed every semester. For sixteen of the eighteen competencies, two written assessments (first and second opportunities and often a third) were compiled. Three to four of these assessments were moderated per semester. Resits were allowed for students who did not achieve. Students who missed assessments had to provide medical certificates (or other evidence) to Programme Leaders to get permission to sit an assessment.

These rigid modes of assessment requiring very precisely described responses, made students increasingly dependent on being spoon-fed by lecturers who often started coaching students for assessments. Accessibility was limited as students became dependent on their lecturers. When a student missed a class for a week or more it was very hard to catch up. Equity was affected in making it hard for people with family or work commitments to successfully work in their own time at their own pace. The system was inflexible since, for example, the whole class sat their first

assessment opportunity at the same time assuming that everyone worked at the same pace and would be ready on the same day and time. Catching up depended on the availability of the lecturer. Since the lecturer was teaching, resits often had to be done after school or in breaks. This culture of dependant students, regular lecturer meetings to coordinate efforts, the resits and the setting up of the multitude of assessments, increased the work load for lecturers. Student success and retention increasingly depended on lecturers making one lecturer remark: "*This course is a monster".*

Analysis, using the framework of Chickering and Gamson (1987), showed that the weak points of the course by the end of 2014 were its teacher-centred, inflexible, labour intensive delivery mode and that it did not encourage active learning and cooperation between students significantly: instead it encouraged lecturer dependence in students. The test-like assessments had to be marked by hand by the teachers which made feedback slow.

Something needed to be done to enable students to be the drivers of their own learning and make the course delivery manageable while still ensuring that the assessment results were trustworthy across all the different classes.

In an attempt to tame this hardly manageable "beastly" labour-intensive course that evolved over time while simultaneously improving the course's accessibility, flexibility and equitability for students, the process to develop a *blended* L3 Health science course therefore started and was implemented in 2015.

In the specific situation of the L3 course in this study, a blended mode had some attractive features: it was foreseen that online work would enable students to work more autonomously especially when learning the essential basic vocabulary of the field (such as the scientific names of the skeletal bones and names and symbols of the chemical elements). In these cases where repetition was essential, students could teach themselves till they knew the parts well and could label diagrams or models of the systems. (Without this vocabulary firmly entrenched, further learning in the field becomes very hard). Because the online support would be provided

as content as well as self-marking quizzes, support from the online content could be available whenever the student had time available. Readings could be included in the online quizzes so that it could be used to guide students through the content. It was further hoped that while some students worked online in class, individual students could be suitably supported by their peers and/or in one-on-one conversations with their lecturer. Some periods could be used for labs, short lessons and group and individual activities instead of up-front teaching of content. In this way flexibility in delivery, ease of making individual support available and opportunities for group and individual activities could be increased.

In a meta-analysis of numerous studies, Means, *et al.,* (2010 : xv – xvi) found that blended learning offers the most efficient teaching and learning environment with superior student learning outcomes (University of Washington, 2010). Carroll, *et al.,* (2009) and Albion *et al.,* (2010) agree that a blended mode could improve the course quality while improving student experience. Rapid assessment and communication would be further advantages of courses with online components (Carroll, *et al.*, 2009 and Albion, *et al.*, 2010). Monitoring learner activities and performance would be possible using advanced online techniques (Corbi, *et al.*, 2014).

Priorities and approaches in the design of this blended course

Some advice on what to keep in mind when creating the optimum engaging learning environment was found in literature:

1. **Self-regulated and self-directed students:** Walsh, *et al.*, (2011:3) envisage a learning and teaching environment where learners *"reflect on their own learning and become self-regulated and self-directed".*

In order to empower the students to become self-regulated and self-directed it was proposed that the existing L3 Health Science resources should be scrutinised and specifically customized for the course to be within the reading capabilities of the students. Concerns about the tendancy for blended environments to develop high cognitive loads (Chen & Lu, 2013) with lots

of posted material, had to be heeded by keeping the students' level of academic development and the course's time limits in mind. (Standardised tests from the NZ Tertiary Education Commission (TEC) were used in the beginning of the course to determine the reading capabilities of the students). Support and stair-casing had to be maintained to keep students within their zone of proximal development, but also stretch them enough so that they could grow (Vygotsky, 1978). Towards the end of the course scaffolds had to be gradually removed.

The proposal was that each of the first three projects had to include a component following a behaviouristic approach, as proposed by Ertmer and Newby (in Mergel, 1998:19-20). Behaviourist instruction may be the most suitable approach for "*knowing what"* as it can effectively facilitate mastery of the content of a profession as it represents knowledge transfer in an efficient, effective manner. It should however not be the only approach. There must be emphasis on using the knowledge to construct schemas and discovery of connections between parts, solve problems and develop higher order thinking. *"Advance organizers, mnemonic devices, metaphors, chunking into meaningful parts and the careful organization of instructional materials from simple to complex*" are cognitivist features essential in guiding students in the "*knowing how*" as they build understanding (Mergel, 1998:15; Ertmer & Newby, 2013). In the final project, ill-defined problems could be used to enable students to construct their own knowledge using a more constructivist approach.

So in order to scaffold student-learning, the course materials for every one of the four projects done over a four to five week period, was visualised as spiraling from simple to complex, from behaviouristic to cognitivistic to constructivistic and the same applies for the whole course as well: every project demanding more self-directedness, independence and higher cognitive levels than the one before.

Once the course was available, the lecturer had to take a step back and allow students to take responsibility while supporting them, making work available at the rigth time, monitoring students, tracking their progress and guiding them to become gradually more and more independent.

To enable students to access the online materials independently, two weekly computer lab periods were requested. One laboratory period and one ordinary classroom period were used. (Periods have a duration of one and a half hour).

To empower students the following resources were made available:

Online resources:

eBooks for all four projects were developed, the first two as printed copies and online and the last two only online. This replaced printed worksheets that were provided to students in classes before.

- **Online study material**

Suitable online resources like YouTube videos, Interactive web pages and content pages (PowerPoint, Word and pdf) were scrutinized for correctness and carefully selected for their relevancy and suitability to be included in the course and/or developed from scratch. The length of readings and videos and the vocabulary used were stair-cased to match to the capabilities of the students at every stage of the course (with starting points based on the above –mentioned TEC reading test that was done at the onset of the course). Some videos were edited with Vimeo to draw students' attention to certain concepts and to break up any monotony. Documents with longer readings were also accompanied with guiding questions. These resources were included as Weblinks or attached as documents.

- **Online assessments:**

Computer-marked **formative assessments** (FA's) were developed for fifteen out of the eighteen competencies. They included all the different kinds of questions available on the LMS. Questions were often based on embedded readings or videos. They were organised around the four projects. This enabled students to read through content, explore the expectations, self-assess and get immediate feedback.

Students had unlimited access to these customised FA's to enable them to teach themselves in micro-steps. Students could do these FA's as many times as they wanted and they used them to explore new content, to learn, to catch up, to revise and prepare for assessments.

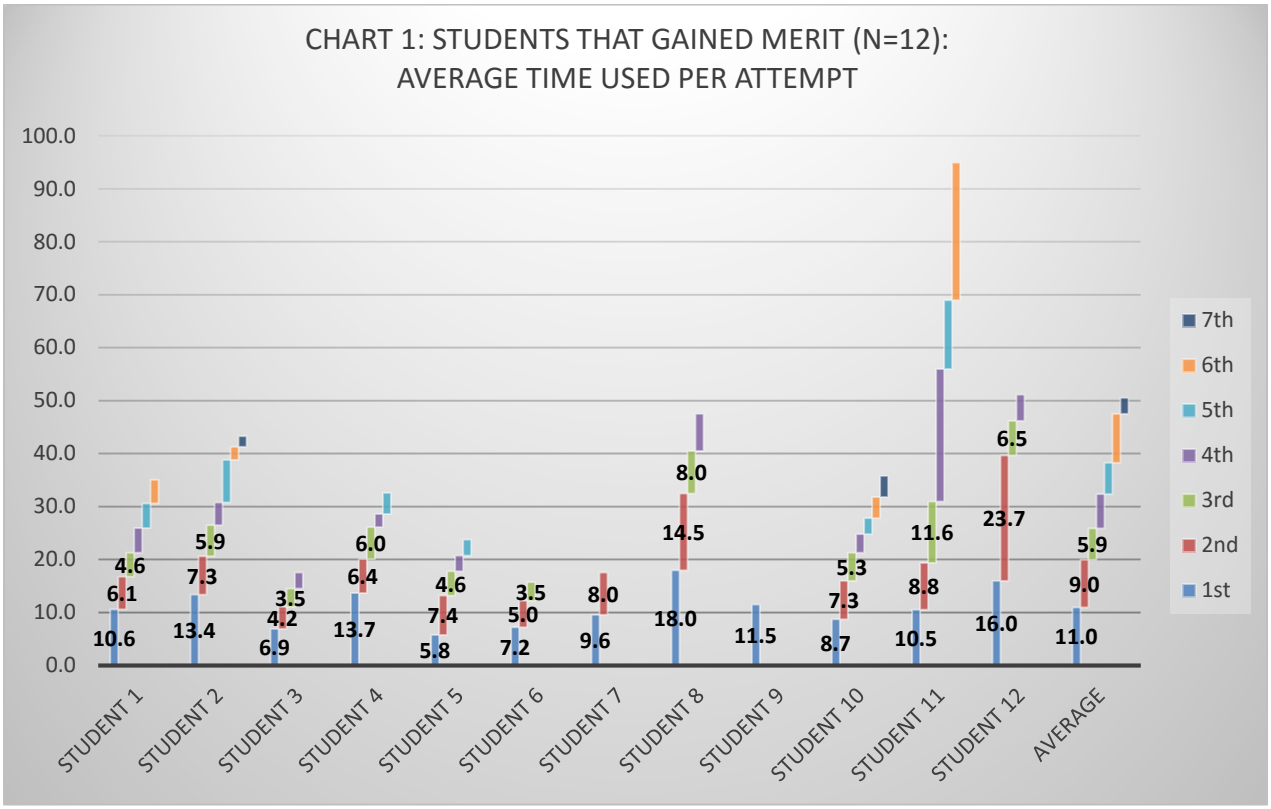

Chart 1 above gives some information regarding how twelve students that obtained a merit pass for science made use of these FA's. The times given for every attempt is the average time for all the first attempts for all the FA's. From the chart it is seen that students 2 and 10 did some of the FA's up to seven times and that the average time that students took to complete the quizzes became shorter and shorter as they mastered the content. Another interesting aspect of the student-use of these online assessments was that more students made use of the online FA's when the summative assessment was also online (see table 2). For every three FA's done during school hours, two were done after school hours.

Table 2: The number of students (N= 69) making use of the online FA opportunities per competency.

Comp#	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Mode	O			L	W	L	O	W*	O	A	O			W	L
N =69	52	54	50	40	38	25	54	24	50	25	41	47	47	34	27
% of participating students	75	78	72	58	55	36	78	35	72	36	59	68	68	49	39
Key: O= online; L= Lab based; W=Written; W* = Written open-book; A= Assignment															

Two computer-marked **summative online assessments** (checkpoint and alternative) were developed for eight out of the eighteen competencies. These quizzes took between five to twenty minutes to complete. They had to be done in class and had a deadline, but students could, before the deadline, indicate their readiness to do it. Students made use of it in different ways. Most usually did it on an agreed upon day (main group), but some that knew beforehand that they would be away for a while, worked faster through the materials. They then sat the checkpoint, which was made available to them using password control, at an earlier date. Some missed the agreed-upon date and were allowed to sit it within a week after the main group sat it. If not possible or if they failed the first opportunity, a second opportunity, using the alternative checkpoint, was allowed.

One lecturer-marked online assignment on the topic of energy in the Nutrition project had to be done over a two week period using amongst others Excel tables and graphics and an online calculator.

Non-online resources:

Kettlewell, *et al*., (2012) argue that learning that engages must be structured around practical hands-on applications. Assessments involving practical skills were done in the laboratory. Printed laboratory manuals for the weekly laboratory activities contributed to help students to

learn how to work confidently, safely and professionally in the laboratory with microbes, dissection instruments, microscopes, chemicals, processes and equipment. One of the competencies centered on laboratory skills and a minimum attendance of seventy percent applied here.

Writing of laboratory reports was scaffolded and the final assessment was done after a number of written formative assessments.

Other written assessments included tasks where information had to be presented as reports, mind maps, tables, paragraphs or where data analysis needed to be done. Most of the written and presentation activities were done in close collaboration with the Literacy specialist.

2. Coherent aligned course:

It was seen as important to ensure that the instructional materials described above, contribute to the achievement of the stated competencies and module/unit learning outcomes. The competencies, course resources, formative assessments and summative assessments had to be aligned. As suggested by Kizilcec, *et al.,* (2013) the course content had to be simplified, following micro-steps and include cognitive tools to engage students and to increase the learners' ability to succeed.

Heeding this advice the assessment around the eighteen competencies was retained unchanged. The way it was marked was changed however. Instead of ticking off the different assessment criteria for every competency, an attainment of an average of 70% in a summative assessment meant achieved and 85% meant merit.

Summative assessments were made more engaging and more activity-based than before. They aimed at promoting a growth mind-set among learners and included a variety of activities: behaviouristic online quizzes used to test knowledge acquisition (like in labelling the parts of the digestive system and giving the functions of the parts); lab-based activities for skill competencies; a take-home online assignment; written closed- and open book assignments and

reports; and presentations. Written work and presentations were marked by both the Literacy and Science specialists to look for evidence of achievement of different competencies (knowledge and application in the Science course, and writing, speaking and listening for the Literacy course).

Kizilcec, *et al.,* (2013) also suggest the inclusion of simple "*cognitive tools*" to allow interpretation of course content and aids for staying organized. The eBooklets explicitly guided students in using cognitive tools like mind maps, tables and annotated diagrams to model these ways of thinking. These eBooklets gradually removed the support structures to allow students to present work in their own way. Some of the summative assessments also centered on the use of these cognitive tools which were also explicitly addressed in the Literacy course.

3. Connected learning communities:

In order to engage students that are disengaged, as applicable to some L3 Foundation Education students, Walsh, *et al.*, (2011:3) propose a communicative and inclusive environment supporting the acquisition of digital skills. This environment must have "*a high degree of collaborative learning, interactive content, as well as interactivity among learners and between learners and practitioners".*

Kettlewell, *et al*., (2012) warn that simply including technology is not sufficient to ensure learner engagement and may take attention away from quality teaching and learning. They advise educators to engage learners by forming relationships between learners and staff, providing one-on-one support, and making programmes flexible to meet learners' needs. Personalised learning programs, culturally relevant experiences and *"peer support models and practitioner-learner links"* are seen as helpful in engaging students.

To heed this advice, Facebook secret groups, Padlets and discussion boards were utilized to create online communities besides the in-class activities aimed at collaboration and relationship building. The Facebook groups were set up as secret groups (which are the highest from of security possible in Facebook) to ensure the privacy of students and the

lecturers who were the only members. No one can discover the groups by accident and no one can become a member of the group unless allowed by the lecturer administrator. It is further impossible to share material from this group to the web. Students and their lecturers posted notifications, interesting course-related articles and videos, photos and videos of class activities and notes on the whiteboard and so forth.

During the two weekly computer lab periods, students could interact with the lecturer on a one-on-one basis or as small groups while the rest of the students were interacting with the online materials. One weekly laboratory period was used, as described above, to give students an opportunity to interact with the lecturer and other students while working in pairs or small groups on practical tasks like using microscopes, doing dissections, investigating chemical processes and working with microbes. One period in an ordinary class room was used to do group activities, some upfront teaching, completing tasks using books as information sources, doing presentations and modelling with play-doh, recycled and other materials.

4. **Access to online resources:**

Changes in delivery to accommodate this blended model included the above-mentioned scheduled computer periods at school to improve access for all, explicit training to look for, find and use resources on the LMS and www, and setting up activities, tasks and assessments in a way that made it unavoidable and sensible for students to use the LMS. It was important that students should view the online resources as essential and valuable help, since Ellis, *et al.*, (2013) found a significant relationship between positive approaches to learning technologies and academic achievement.

Investigating students and lecturer experience and progress

To see whether this model did not disadvantage students and supported them at least as well or perhaps better than the labour- intensive model, student results had to be tracked and analysed. To understand how students experienced the process, engaged with it and

responded to the course delivery mode, students were questioned and surveyed. A variety of tools were used to investigate the reception and effects of this model.

An online survey for L3's (N= 59 – representing 81% of the population) and an open-ended questionnaire for L4's (N= 38 – representing 65% of the population) were used to find out about student experience of the online material. Pre- and post-tests were used to see whether L3 students retained the content that they learnt. Informal interviews with four lecturers, all involved in teaching this course, gave some insight into their experience.

1. **Level 3 students:**

In the online survey L3 students were asked about their experience and use of the online resources. 73% of the students in this study reported that they used the online resources all the time or most of the time with the remainder using them some of the time. There were no students that did not use the online resources. 71% did most or all of the formative assessments, the rest did some. The online formative assessments were the online resource of choice with 69% of the students in the class as a whole preferring it above other resources. Readings, worksheets and PowerPoints were used to study the topics, but not preferred as much as the formative assessments. It seems as if the students preferred to learn about the content by using guiding questions based on videos and embedded snippets of information rather that reading through long passages, summarising them and then testing themselves. In this student group 37% asked for more online summative assessments for the future. Scaffolding could easily be accomplished here by making the passages longer and longer.

Internet access at home was a problem for 17% of the students in this group that reported that they had internet access only at school, with a further 24% that had limited access at home in places like internet cafes and at KFC.

To determine whether L3 students retained the knowledge as general science knowledge a self-developed quiz was used as a pre- and a post test. It contained a number of questions covering

all the topics in the course. Both pre- and post tests were given to the students without prior notice.

In the pre-test, taken at the start of the course, the participating students attained an average mark of around 37% with the highest mark around 60%. An average of 67% was attained in the post-test with the highest mark around 90%. This was taken as confirmation that students retained the knowledge that they acquired during the course fairly well.

The question may however be asked: how did these students in general achieve in L3 when compared with how the students in the previous mode of delivery achieved? To find an answer to this question the science results of three semesters were compared. Two first semesters and one second semester after the implementation were compared with the same before the implementation. Despite high expectations on the researcher's part and good stories of individuals that achieved despite adversities, the L3 results for this cohort as a whole were not significantly better than that of previous groups.

Table 3: Comparison of L3 science results for three semesters before (2013-2014) and after (2015-2016) implementation of blended delivery mode

Course results	**Average retention**	**Pass / enrolled rate**	**Pass / retained rate**
Before blended (2013-2014) (N=111)	81%	68%	84%
Blended (2015 onwards) (N= 79)	88%	72%	82%

Because of the few sets of results that could be used, it would be naïve to attribute the 7% increase (table 3) in retention rates to the change in delivery mode alone. It may however have contributed to it. The pass /enrolled levels increased slightly (with 4%) but the pass retained decreased with 2%. More students in other words stayed longer, but not all of them were successful. Encouraging news is that despite the lower levels of lecturer-student-interaction,

the achievement was at least *on par* with that of the students that were so reliant on interaction with their lecturers in the previous delivery model.

These findings are in line with what Sankey, *et al.*, (2010) found, namely that exposure to multimodal environments including online sources led to improved enjoyment and better understanding, but that students did not perform better. It also confirms Anderson's (2003) theory that not all types of interaction (student-content, student-lecturer, student –student) need to be at high levels in order for students to achieve. L4 lecturers in semester 2 in 2016 further report in meetings that the students coming from L3 are ready to go, knowing the LMS environment and remembering the content that they learnt in L3. They describe them as better prepared than students coming in without L3.

2. Level 4 students:

Thirty-eight L4 students that participated in the blended L3 course were followed up and they were asked about their perception of how well, in their opinion, the online materials in the L3 Science course helped to prepare them for success in Bioscience and Anatomy and Physiology in L4. A summary of their responses are reported in table 4 and 5.

Table 4: Online L3 Science course materials preparing for L4 (N=38 representing 65% of the L3 students that continued to L4).

	Very well	Well	Somewhat	Not at all
BIOSCIENCE	47%(N=18)	32%(N=12)	21%(N=8)	0
	79%		21%	0%
ANATOMY & PHYSIOLOGY	47%(N =18)	29%(N=11)	24%(N=9)	0
	76%			

To find out more about how the students experienced the online course materials, the L4 students were asked to comment on the ways in which they benefited or not from the course design. Their comments are summarized under themes in Table 3.

Table 5: Specific comments on online L3 course resources by L4 students

HELPFUL	ACCESSIBILITY, FLEXIBILTY & EQUITY	NEGATIVES
• Very helpful • Helped with L3 • Very informative for checkpoints • More summarised than in book	• I could prepare for tests at home • Good to see visible on screen • I could study more because there were more resources • Great- gives more information • Enable me to find information that I could not find in lab book	• Prefer lecturer to get quick response • Sometimes confused – what particular subject or information to learn

Overall the results tell that the majority (76% and 79%) of the students felt positive about how the online materials in L3 prepared them for L4 (table 4 and 5) and that they valued aspects like being able to prepare for tests at home.

What then happened to these L3 students in L4?

In a correlation study between L3 results and L4 results the only significant correlation, although weak($R^2 = 0.5036$), that could be found is one between the number of competences achieved on merit (85% or above) and the Bioscience overall results on L4.

Table 6: L3 results as predictors of success in L4 (N=58).

	Number of competencies achieved out of 18	**Number of competencies on merit**
Qualified for nursing with 65% in sciences in L4	17.6	10.9 (9 merits required to pass course on merit)
Passed L4 with 50% in sciences in L4	16.6	5.8
Below 50% in L4	15.3	4.3

In table 6 it is clear that good performance on L3 is linked to good performance on L4. While passing on merit (obtain at least 9/18 competences on merit) gives one a good chance of passing L4, just passing L3 (obtain at least 13/18 competences on achieve) is no guarantee for passing L4. Five percent of students that did not pass the sciences in L4 got more than seven merits in L3. These students failed to complete the course and missed out both examination opportunities. Three percent of students who got more than 6 merits in L3 passed their sciences but did not get 65%. One of them also missed out on one examination.

Only 3% of students that passed both sciences with 65% got less than seven (namely six) merits in L3. It therefore seems that achieving seven merits could be seen as a predictor of success in L4 science. Perhaps one has to assume that these students that did not at least achieve seven merits, could be advised that they should consider other options than the university preparatory course on L4 or that they will have to work super hard on L4.

It seems as if L4 students coming from L3 disengage at a higher rate from the L4 course than students coming in at L4. Further research involving inteviews to find out the exact reasons for disengaging is planned. At this point the assumption is made that the toll that juggling family commitments and studies take on these students for a second period of six months may be one contributing factor in this phenomenon (as reported earlier, around 43% of the students in one

cohort of L3 are mothers with young children, so the assumption could be made that the figures are similar for L4).

3. **Lecturer experience:**

The two lecturers teaching on this course that also taught in the previous mode are unanimous that it is far easier to teach now than before. Once it was set up, the delivery mode reduced printing costs and reduced lecturer workload significantly. Students could be scaffolded and stair cased into using the online resources:
"*Printing out the first two booklets was a good idea to give the students time to settle in in the online environment before demanding more. The rest of the booklets were made available online to students to complete".*

They were of opinion that the two computer classes made it possible for the instruction to be individualized and increased flexibility in doing assessments. They further agreed that the blended mode made it possible for students to "*do more independent work using the online resources and own searches, videos (with earphones), completing assignments and other project work, prepare for assessment, and do assessments and resits. Students could also prepare for the classes before the time and work at their own pace.* Students *"could get a full picture of the topics"*on their own.

Lecturers did not feel threatened. They describe their teaching role as: *"Lectures gave short "lectures" to introduce topics, then students could go into online readings, PowerPoints and other online materials like worksheets and quizzes".*

The Facebook pages were utilized enthusiastically by the lecturers.

The lecturer that never taught on the course before also expressed her surprise at how easily she adapted to the new course and delivery mode.

Overall reflection:

Reflection on the course as it was presented after redevelopment of the resources confirms that a number of issues was addressed in better ways than before. They could help to explain the improved retention rate:

Flexibility was improved by allowing students the freedom to control their own learning processes by pacing themselves within set time limits. Online summative assessments could be done asynchronously in class when students were ready. This could and did allow success, for example, for students with temporary family duties.

Accessibility: It was found in the survey of other groups than those reported here, that up to 28% of the students in some groups were without home computer internet access. Measures to deal with these accessibility issues included the use of social media. Facebook was the method of choice to communicate messages, notifications and photos of white board notes, class presentations, videos and micrographs from the microscope, lab results, class events, news and related interesting news articles. Students got notifications on their phones and the lecturer could immediately see who saw the items. Students were used to Facebook and it integrated their personal lives with the course. To ensure privacy, secret groups were used. They actively participated and contributed on this forum.

Some students printed out the eBooks / PowerPoints while at school. On special request books were printed out for students without internet at home. They could then continue working despite not having internet access or data. During the computer periods at school they could scan over the resources and print or save what they needed. Some of the high performers in the group told their lecturer how they made use of resources that they printed out while at school and/or downloaded on a USB.

Equitability: Many of the students in these health cohorts are mums with young children. To give them equal opportunities to achieve were therefore an issue, since a sick child or family issues were frequent reasons for absenteeism. Some serious students had to leave early to pick up children. One mother had to stay in hospital for two weeks with a child that needed to

undergo procedures. This is where the online resources were really helpful to keep them on board. This specific mother dealt with this expected situation by working faster through the course work so she could do the online summative assessment two weeks before the other students (scoring 90% in it). Another mum, struggling for weeks with a sick child which made her attendance extremely erratic, kept up to date by working online and occasionally contacting the lecturer for clarification of concepts and contacting other students on Facebook to post some whiteboard notes. She came back when her child was well and passed with flying colours.

Conclusions

The blended design is no magic bullet for improving student success on higher levels. It may however be linked to better retention and good student experience. It enables students to access online resources whenever they have the time and opportunity, to be self-directed and to be well-connected to other students and their lecturer (but not dependent on him/ her).

Flexibility with assessments without compromising on quality and consistency is possible. After an intense input of effort and time while developing the online formative and summative assessments, eBooklets and other resources, the course became surprisingly easy to manage with far less time spent on marking, meetings, resits and development of assessment instruments despite far less staff available. One-on-one time with students is opened up in the computer labs and students can do assessments asynchronously.

So overall, to conclude, the “beast” became a lamb! However, since the traditional ways of thinking and doing are challenged by these new possibilities, numerous issues like a common understanding among lecturers of the use of asynchronous assessments and procedures for quality control need rethinking and adjustment.

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