

BRUSH IT UP

On-line resources for fostering independent learning

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Abstract—As Australian universities are increasingly pressured into attracting participation of groups previously underrepresented in the higher education system, the need to support these cohorts of students becomes more evident. This paper describes an online resource developed by members of the Linguistics team at Griffith University in Brisbane, Australia, to engage students with disciplinary knowledge, provide opportunities for independent and/or small group practice, test their understanding of materials covered in the lectures, self-evaluate their work, conduct exam revisions, and overall scaffold the learning process, fostering independent learning and self-reliance. While reporting on students' perceptions of this resource, we finish the paper with a word of caution about the effectiveness on online learning in university settings.

Keywords—online learning; higher education; net generation; student engagement; independent learning; linguistics

I. INTRODUCTION

As a result of government funding cuts and decreases in international students' intake, Australian universities have become increasingly dependent on local students. The imperative to attract local students has been formulated around two catch-phrases: the call to 'increase participation' in the university system, and the call to 'improve the first year experience' (FYE) of students enrolling in higher education.

The call to 'increase student participation' (i.e., to attract students from previously underrepresented groups such as from low socio-economic background) has resulted in growing numbers of students in tertiary studies being identified as 'at risk'. This 'at risk' category is defined as students having attained low exit high school scores, coming from a low socio-economic background, being a member of the first generation in the family to attend university, or as having low preference for the degree in which they enroll (hence, low motivation). Arguably, students 'at risk' may need more academic support than students in previous cohorts.

The call to improve the 'first year experience' of higher education is an attempt to redress the high levels of attrition rates that plague all Australian universities. These high attrition rates hurt universities financially, but also reveal a failure to help students flourish and achieve their goals. Hence, serious consideration should be given to developing means to scaffold students learning, particularly in their first year of studies.

Thus, these two calls pose a significant challenge to universities, namely, finding ways to cater for the needs of additional students with diminishing government financial support. In this context, the proliferation of course modalities (such as MOOCs, open learning, hybrid/blended learning, and lecture capture among others) has been hailed as the panacea that would allow universities to cater for more students without stretching existing resources [1].

Taking into account the characteristics of the student cohort and in an attempt to provide additional support, increase learning opportunities and scaffold the learning process beyond the classroom, members of the Linguistics team at Griffith University in Brisbane, Australia, developed an online resource to complement traditional face-to-face teaching. It was expected that engagement with the resource would motivate students, increase the time devoted to the subject, and positively correlate with levels of achievement. It was also expected that this resource would foster more independence and self-direction in learners.

In this paper, we briefly describe the resource, discuss its expected benefits and the learning principles that guided its development, and evaluate it in terms of student satisfaction, learning effectiveness, and impact on teaching practices. We finalize the paper with a reflection on the challenges and limitations of online/blended learning.

II. BRUSH IT UP! LANGUAGES AND LINGUISTICS ONLINE

A. Aim of the resource

The teaching of linguistics at undergraduate level is traditionally conducted through a combination of theoretical content covered in lectures and language problems and exercises, typically discussed in tutorials, where students develop and test their understanding of linguistic theories. Due to time constraints, the number of exercises assigned as homework and analysed during tutorial time is usually limited. *Brush It Up! Languages and Linguistics Online* (henceforth *BIU*), was developed to redress this limitation. *BIU* provides a bank of on-line problems and exercises with feedback facilities, and combines disciplinary knowledge with targeted and hence highly relevant academic skills. This resource is available to all linguistics students throughout the course of their studies. Students can access this resource flexibly through the university's learning management system, Blackboard.

The online resource addresses a number of key objectives identified in Australian Universities Academic Plans. It seeks to improve student engagement through enhanced cohort experience in the first year and beyond, to enhance the learning experiences of students in large classes and to develop resources that promote independent learning and foster critical thinking skills. Critical inquiry is the basic skill that underlies successful performance at university level. We believe that if students are exposed to and given tools to practice basic principles of critical thinking in the early stages of their degree they will be able to easily and successfully transfer these skills to second and third year level and beyond. Thus, in addition to catering for beginner students' needs, *BIU* aims at scaffolding the learning experience across the whole linguistics program.

BIU (its main interface is shown in Fig. 1) was designed along two main pillars of university study, and thus includes tools and activities (1) to build and consolidate the command of the discipline, and (2) to develop academic skills. In addition, *BIU* provides links to additional useful resources outside of the university that enhance the learning experience (e.g., audio sources, tools complementing the materials, such as a syntax tree generator, links to useful organisations). The use of *BIU* and of the materials and activities contained in it is absolutely voluntary. *BIU* is not part of any assessment, and lecturers do not get to see how well students who take advantage of the *BIU* offerings perform in the activities.

B. Expected benefits

- 1) From an educational perspective, *BIU* benefits students by making available linguistic resources to test their understanding of materials covered in the lectures, practice independently or in small groups, self-evaluate their work, conduct exam revisions and even revise and prepare for more advanced courses at their own pace. These activities and resources are expected to increase self-direction and engagement with the course content and learning processes, factors that have been identified as conducive to long term learning.
- 2) From an affective perspective, *BIU* offers students a private, non-threatening tool that fosters their sense of confidence and self-worth. This is particularly important for international students that usually lack confidence in their English language competence and are therefore reluctant to ask questions in class, as well as for 'at risk' students who may need additional support. The resources bank and online platform have the capacity to improve students' experience and satisfaction as well as improve graduate outcomes. An increased sense of confidence, self-worth and engagement is also expected to contribute to retention rates [2], [3].
- 3) *BIU* also benefits staff since it frees valuable classroom time for content delivery and discussion rather than for problem checking, in the certainty that students will receive the necessary feedback for the linguistic problems that they complete outside of class. Lecturers have materials available through the resources bank to assign as homework or to use for assessment purposes.



Fig. 1. Main interface of the *BIU* resource.

C. Key pedagogical principles

The crucial consideration when developing this resource was to provide flexibility of access and content, and a variety of quality learning experiences to motivate learners, so as to cater for the diverse needs of all students enrolled in our degree. This involved anticipating how students' needs would change over the course of their studies. In what follows we summarise some of the key pedagogical principles that informed our practice.

Catering for 'at risk' student populations

Research findings indicate that low socioeconomic background students often feel alienated from university culture [4]. *BIU* has the capacity to alleviate these feelings by bridging the gap from potential prior educational disadvantage and helping facilitate a smooth transition from high school to university. While a considerable number of academic skills workshops are currently offered free of charge at the Library, these workshops generally do not provide extensive practice of the discipline specific academic skills, and do not offer flexible access to skills exercises beyond the workshop sessions. Also, a high percentage of low SES background students combine university studies with work, and thus find it hard to access these much needed workshops. This is also of particular relevance to mature age students who may have competing commitments, and to international students, who due to lack of confidence in their English language competence and cultural factors are reluctant to ask questions in class.

Catering for "the Net Generation"

The *BIU* resource addresses the unique characteristics of what has been called "the Net Generation", i.e., the first generation to grow up with digital technologies, and their preferred learning styles, which are said to include: independence and autonomy, interaction with peers and interactive environments, self-directive learning opportunities,

exploration, use of different resources to create personally meaningful learning experiences and hand-on inquiry-based approaches to learning [5], [6], [7]. *BIU* hence has the capacity to improve students' experience and satisfaction as well as improve graduate outcomes and increase engagement with the program content and learning processes.

Scaffolding the learning process

This online resource has been designed to scaffold the learning process across the whole linguistics program, as it is available to all Languages and Linguistics students throughout the course of their studies and serves different needs as students progress through their degree. For instance, *BIU* is used as a revision and self-testing tool in the initial stages and as preparation for more advanced courses. *BIU* also provides extension activities for curious learners. In the area of academic skills, specific tutorials and self-testing exercises lead students through different areas of academic activity, from learning how to use databases to essay writing (with the inclusion of, for instance, interactive annotated examples of good and poor essays, see Fig. 2). Thus this resource addresses the two main pillars of university study, namely, command of the field and academic skills' development.

Implementing principles active learning

There is consensus in the literature that students learn best when they are actively practicing, solving problems, spacing learning over time, interleaving worked example solutions with problem-solving exercises, combining graphics and verbal descriptions, integrating abstract concepts and concrete examples, giving quizzes, helping students allocate their study time effectively and asking students deep questions rather than the "who, what, when and where" kind [8]. Although learners typically conceptualise 'learning' as 'acquisition of knowledge' [9], these activities involve a move away from 'guided learning', where the teacher makes all the relevant decisions, to 'experiential learning', involving practicing in a safe environment, to 'self-directed/discovery learning', where learners, guided by intrinsic motivation and intellectual curiosity, are free to explore and set their own goals.

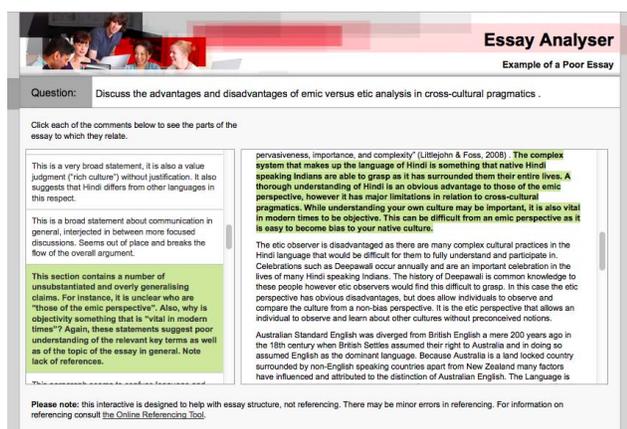


Fig. 2. View of the interactive annotated poor essay.

Self-testing

Self-testing is another guiding principle, which has been identified as highly conducive to learning. Hartwig and Dunlosky [10], for instance, found a positive correlation between self-testing and scheduling one's study on the one hand and university grade point average on the other hand. Conversely, low performers were more likely to engage in cramming for exams while high performers space their study over time. Similarly, Dunlosky, Rawson, Marsh, Nathan, and Willingham [11] argued that educational outcomes could be partly improved by helping students 'better regulate their learning through the use of effective learning techniques.' To this aim, the team investigated 10 techniques. These include elaborative interrogation, self-explanation, summarization, highlighting (or underlining), the keyword mnemonic, imagery use for text learning, rereading, practice testing, distributed practice, and interleaved practice. Some of these techniques are intrinsic features of *BIU*. The authors found that taking practice testing and 'distributed learning', i.e., spacing learning over time, were of high utility because they benefit learners of different ages and ability levels and have been shown to enhance students' performance across many areas. There is ample research attesting to this effect (see for instance [12], [13], [14], [15], among others). What makes self-testing so efficient in promoting long-term retention is the provision of immediate feedback, which computers can easily do.

D. Brief description

At the time of writing this article, there were 45 online tests available, with 448 exercises of different levels of complexity (i.e. an average of 10 exercises per test). An example question is provided in Fig. 3. 50 of these exercises (i.e. about 11%) were developed by students themselves. Devising questions and exercises has been judged by these students as a very valuable task, as it allowed them to approach the field and materials from a different perspective.

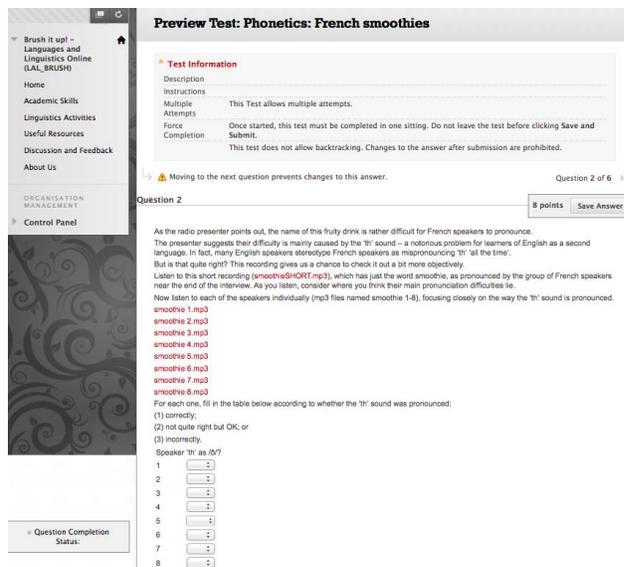


Fig. 3. View of the interactive annotated poor essay.

In addition to these disciplinary knowledge building activities, a whole suite of materials aimed to explore and offer practice opportunities for academic skills development targeted at Languages and Linguistics students has been devised for *BIU*. This suite covers: materials on academic writing and essay writing (including interactive good and poor essays, Fig. 2, an extensive discipline specific research tutorial, Fig. 4); presentations (topics such as research for, structure of, and visual aids for presentations as well as time and stress management); referencing and plagiarism (including online referencing tools and tutorials, a referencing quiz, as well as a definition of plagiarism, links to university policies, and tips and an activity on avoiding plagiarism); critical reading (with tips on reading strategies and a self-testing activity); a survey to allow students to determine their own learning style (Fig. 5), and a link to the Study Smart tutorials, among other academic skills.

E. Evaluation

The outcomes of the *BIU* project were evaluated extensively through qualitative and quantitative online and face-to-face procedures. Evaluation methods included: 1) anonymous surveys on the perceived usefulness of the resource and the activities' quality; 2) monitoring the number of hits to the site; 3) comparisons between academic results of high and low frequency users; 4) focus group discussions to identify specific features that could be improved. Due to length considerations in this paper, we focus on the students' perceived effectiveness, preference for online vs. paper activities, and strength and weaknesses of the resource. The findings were elicited from 83 students who completed the survey.

F. General perceptions and overall use of the resource

Overall, the responses indicated a high level of familiarity with the resource, suggesting that *BIU* is accessed and utilised by a majority of students. 98 per cent of respondents reported accessing the resource at least once. Furthermore, 57 per cent of responding students accessed the resource once a week, with another 7 per cent accessing it several times a week.

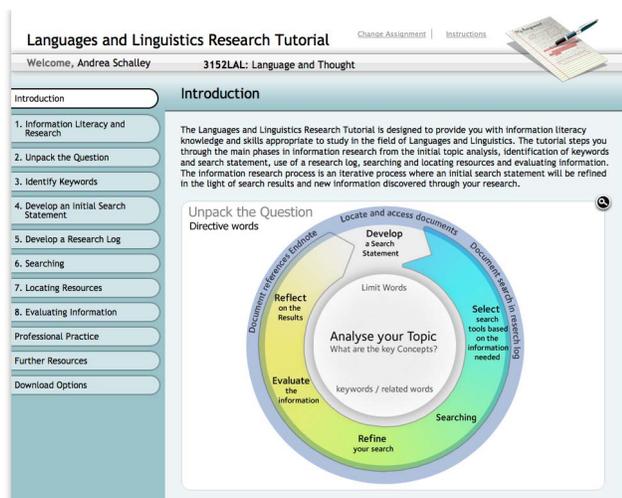


Fig. 4. Snapshot of the discipline specific research tutorial.

The survey indicates that *BIU* was successfully used for disciplinary knowledge consolidation. The main purposes for which students self-reported using *BIU* were found to be practicing of skills / general revision (24 per cent) and self-testing (23 per cent). These were closely followed by exam preparation (21 per cent), and support for course assignments (20 per cent). These responses point to *BIU* being extensively used as a revision resource that helps students build the basic foundation for learning in advanced courses. Furthermore, 98 per cent of the respondents indicated that the resource has been effective for the purposes for which they have used it.

G. Perceived strengths and areas for improvement

According to the open-ended responses, the greatest strength of the resource, identified by 22 per cent of respondents, is its accessibility at any time from any Internet enabled computer, closely followed by the practical advantages to self-pace their learning (20 per cent). Students also valued the useful feedback received for most activities (16 per cent), and the provision of a non-threatening environment in which they can complete the exercises (15 per cent) and obtain information on a range of academic skills (12 per cent) without potentially exposing weaknesses to others. All these features have been identified in the literature as being conducive to independent learning.

Students' suggested improvements point towards a need to increase the variety of exercises and activities currently available on the site, as well as a need to link these activities to particular courses, assessment tasks, study areas, or even specific chapters of the textbook. A preference for more detailed feedback, including links to further information/resources, was also identified. While the navigation of the site was rated as satisfactory in its current form, optimising the resource for use on mobile devices seems desirable.

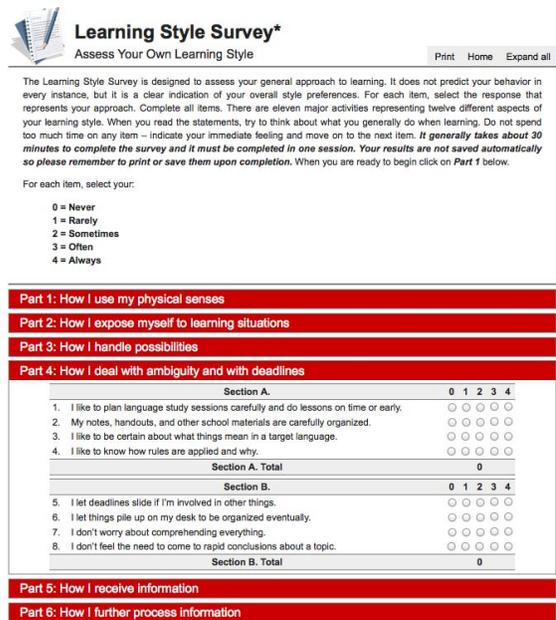


Fig. 5. Snapshot of the discipline specific research tutorial.

H. *Effect on students' academic outcomes*

A comparison between academic results of high and low frequency users was conducted to gauge the effectiveness of *BIU* on students' achievement. The expected correlation between frequency of use and final grades in the course was not found: some of the frequent users obtained high marks, but so did some of the students who accessed the resource sporadically. Furthermore, some of the higher users obtained low final grades. However, it is possible that *BIU* helped students who may otherwise have failed the course to obtain a passing mark. This is a matter of speculation that cannot be answered conclusively. Similarly, we have no means to compare the performance of these students with that of students in previous years who did not use the resource, as the demographics of these cohorts differed greatly in terms of university entrance scores.

Despite the lack of hard evidence, we argue that *BIU*'s effectiveness in developing disciplinary skills is evidenced by the high number of users voluntarily accessing the resource for revision and practice, with 64% of the students reporting using the resource at least once a week, and a number reported using it several times a week for exam preparation. We can thus conclude that students found *BIU* valuable for the aims it set to fulfil.

On an affective level, in an open-ended answer on to the benefits of the resource, approximately a third of the students surveyed self-identified an increased confidence and therefore self-worth as one of the outcomes of using *BIU*. As previously mentioned, an increased sense of confidence, self-worth and engagement can be expected to contribute to retention rates, one of the major goals of the university [2], [3].

I. *Effects on pedagogical practices*

As mentioned above, this resource was not meant to replace lectures or tutorials in the Linguistics courses but to provide additional sources of revision, practice and exam preparation to complements classroom activities. It has been used for that purpose. In addition, in more advanced courses, students used the resource as preparation to cope with more advance materials. Furthermore, students were referred to the academic skills areas to obtain further guidance and practice on academic skills such as essay writing, avoiding plagiarism, etc., and to obtain models of successful essays in the field. The feedback in response to such referrals has been overwhelmingly positive.

III. LIMITATIONS AND LESSONS LEARNED

Despite the positive views expressed by most *BIU* users, it should be noted that the percentage of respondents comprised around 70% of the students enrolled in the classes surveyed. We suspect that a large number of non-respondents had limited interaction with *BIU*. Furthermore, 20 per cent of the respondents expressed doubts about their future use of the resource. With regards to these respondents, we cannot be certain as to what their reasons may be, but based on comments expressed in the survey we can speculate that some students wanted more direction and guidance. Rather than exploring the resource at their own pace some respondents

expressed the wish that the exercises be linked to particular sections of the book – which is hard to do when the exercises are not intended to link to particular sections as textbooks get updated every couple of years. We therefore conclude that the resource did not stimulate intellectual curiosity in those students who were unwilling or unable to take initiatives and expected to be told what to do. This behaviour is consistent with the view of 'learning' as 'acquisition of knowledge' [9] rather than as a process of self-directed 'discovery' which the team believes is a necessary step in the transition from high school into university.

As the use of this resource was voluntary, students were not penalized for not accessing *BIU* and thus a number of students did not access the resource. We argue that lack of access could be an indication of lack of engagement in their studies, either due to lack of interest or to conflicting commitments, as many university students combine work with study in Australia and are thus time deprived. As previously mentioned, one of the challenges our program faces is finding ways to better cater for students 'at risk' (as defined in the introduction). It seems clear that technology and open access to additional resources does little for students who are unmotivated, and this applies to all students, not just those considered to be 'at risk'. We therefore conclude that, while universities can offer opportunities for independent learning, it is up to the individual student to take advantage of these offers. This is a lesson that should be taken into account when hailing open and blended learning as a panacea for all the challenges facing academia today.

Furthermore, many of the frequent users' comments point to the need to continually increase the variety and number of exercises and activities currently available, to provide more detailed feedback, and to optimize the resource for use on mobile devices (e.g., iPad, phones). While we agree that these developments are desirable, the expansion of content and modes of access will need to be conditional on availability of further funds. Much of the content has been developed by linguistics staff, already under pressure from increasing teaching loads, who may thus be unable to dedicate the time required to expand the resource as indicated by students' feedback.

The above discussion suggests that developing successful tools for online and/or blended learning is not a cheap solution that will bring quick benefits with minimal involvement. Rather, effective online/blended learning will require further investigation into suitable teaching practices that take into account the characteristics of the student population and the available technical and human resources [1]. It also requires a large-scale institutional commitment to provide a reliable and robust infrastructure and the funding required to support students and staff.

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