

Evaluating individual teaching on the road to embedding academic skills

Henk Huijser, Lindy Kimmins and Linda Galligan

Learning and Teaching Support Unit, University of Southern Queensland, Toowoomba Queensland 4350, Australia

Email: huijser@usq.edu.au, kimminsl@usq.edu.au and galligan@usq.edu.au

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Based on an evaluation of one-on-one student consultations in The Learning Centre at USQ, this paper argues that there is an important place for individual consultations in a university context, but that this should be seen as part of a number of learning enhancement strategies on a continuum. Embedding academic skills development into discipline-specific curricula would be placed on the ideal end of this continuum, but the insights gained from one-to-one consultations are crucial in this process. An evaluation of one-to-one consultations shows the complexity of student needs, and this paper has identified four levels of this complexity: conceptual “stuck places”, student scaffolding for learning, affect and development, and course and assessment analysis. The arguments are supported by case studies in mathematics and academic writing, in conjunction with survey data.

Key Words: individual student consultations, embedding academic skills, evaluation, academic literacy and numeracy

1. Introduction

In the first issue of the *Journal of Academic Language and Learning*, Kate Chanock (2007a) posed a timely challenge to the community of academic language and learning advisors: “if we wish to maintain our individual teaching in the face of economic rationalisation, we will need to give more attention to the crucial relationship between individual and group teaching” (A1). Moreover, we need to *demonstrate* not only that this relationship exists, but also provide evidence of how it can be exploited to enhance students’ learning beyond the context of individual consultations. Learning advisors know instinctively that they can contribute crucial insights into the process of improving curricula in Faculties, and that they have gained these insights from individual consultations. For example, learning advisors have access to specific courses and the way students engage with these courses, which includes a highly specific knowledge about the difficulties that some students experience with such courses. Lecturers and course leaders do not usually have access to this type of detailed information, and the input of learning advisors in course reviews and redesign would therefore be highly valuable, as it would allow course leaders to target very specific areas of their courses for improvement. However, there are a number of barriers that have hitherto prevented universities capitalising on the potential of closer cooperation between learning advisors and faculty.

There are two main barriers to embedding academic skills. The first is related to the institutional positioning of learning advisors “on the margins” of universities, and the second is the lack of evidence that learning advisors themselves provide. The former has learning advisors usually operating in academic support units, where students can be “referred” by faculty staff. As Tapper and Gruba (2000) note, there is “a strong tendency for academics to refer students to learning support units rather than addressing students’ academic learning skills themselves” (p.

56). In Chanock's (2007b) words, "our centres seem to be regarded as a form of crash repair shop where welding, panel-beating and polishing can be carried out on students' texts – an idea that makes sense only if you regard the text as a vehicle for the writer's thoughts, and separable from the thoughts themselves" (p. 273). She then goes on to provide evidence of a much more complex relationship between writing and thought, which is again something that learning advisors are instinctively very aware of. However, learning advisors have traditionally been slow to provide evidence by engaging in scholarship and research, and sharing those insights with a wider university community of scholars. Not only would such sharing make faculty academics aware of the evidence, but it would also enhance the reputations of learning advisors as academics engaged in "serious" academic work (rather than simply serving a "remedial" function), and this would ultimately lead to more effective collaboration and thus better student learning outcomes. This applies across the board, and includes mathematics, science and IT.

In this paper, we address both barriers identified above, and report on an evaluation conducted over a two week period in The Learning Centre run by the Learning and Teaching Support Unit (LTSU) at the University of Southern Queensland. This is in addition to the statistical data we gather on an ongoing basis. The latter data cover areas such as course and faculty affiliation; whether students are studying off campus or on campus; whether they are domestic or international students; and whether they have visited The Learning Centre before. Although these are valuable data to gather, they are limited in the sense that they do not provide specific feedback on the individual student consultations that are provided. The evaluation reported on here goes into more depth about student satisfaction, but importantly also about student learning. Thus, this paper serves the dual purpose of providing evidence for the role and effectiveness of one-to-one student consultations, while at the same time arguing that students learn more effectively if academic skills are approached as an integral part of discipline-specific courses and programs, rather than separated and 'to be remediated' in a content vacuum.

2. Links between individual teaching and embedding academic skills

In the overall context, the Australian higher education sector has recently gone through profound changes, which have had significant implications for the role of learning advisors. The "new university" (Green, Hammer, & Stephens, 2005) has developed from a number of simultaneous changes, such as the growing role of intellectual labour in the Australian economy, the growing influence of internationalising markets, and the corresponding shift from elite institutions to providers of mass education (Star & Hammer, 2008). In response to increased competition for students and significant decreases in government funding, universities have been forced to adopt corporate governance models in which students are increasingly seen as "clients" (Star & Hammer, 2008). In this context, "providing reliable learning outcomes becomes particularly pressing if one considers the increasing number of international and local students paying up-front fees" (Green et al., 2005, p. 90). Barthel (cited in Elson-Green, 2007) argues for example that "universities have a responsibility to help students develop skills for their professional life, but first they must learn to navigate the minefield of academic conventions and that's an area where institutions also have a clear obligation" (p. 7).

The question of course is how reliability and accountability are to be achieved in a pedagogical sense, and how obligations are to be met. At its extremes, the current pedagogical debate, in the face of the changes described above, centres around those who focus on deficiencies of the modern student and those who advocate a student-centred approach (Green et al., 2005).

The deficiency model, although widely discredited in learning and teaching research and scholarship (Webb & McLean, 2002; Bharuthram & McKenna, 2006; Green, 2007; Woodward-Kron, 2007), is still strong in the imagination of many university teachers, who "maintain a strong belief that they have been employed to teach 'content' rather than [academic] skills" (Star & Hammer, 2008, p. 246). Indeed, such skills are often "seen as *mere* 'by-products' of disciplinary learning, preferably taught in pre-orientation courses" (Star & Hammer, 2008, p. 246, emphasis in original). The term "generic skills", to be taught in "generic workshops", is telling in this respect. The implication of such enduring attitudes for learning advisors is that

they are seen as people one can send students to that need “fixing”. Wingate (2006, p. 465) identifies the crux of the problem with the generic term “study skills” as follows:

1. That they are concerned with techniques and surface problems, and there is often an assumption is that these can be fixed relatively easily.
2. That acquiring these skills serves the short-term purpose of succeeding at university.
3. That they are unrelated to skills needed for work and life in general.

She goes on to argue that “learning how to study effectively at university cannot be separated from subject content and the process of learning”, and argues for what she calls a “built-in [as opposed to ‘bolt-on’] or embedded approach where learning is developed through the subject teaching” (Wingate, 2006, p. 458). Although we largely agree with the desirability of an embedded approach, there is a need for caution. When taken to its logical conclusion, Wingate’s argument can easily be interpreted as an argument in favour of doing away with one-to-one consultations, and by extension doing away with learning advisors, especially within the bureaucratic logic of accounting, “central to which is an economic model of teaching and learning that primarily seeks to reduce wastage” (Chanock, 2007a, p. A-2). In short, “it seems logical to require [learning advisors] to say their piece once to a group of students, rather than over and over to each new student who consults us” (Chanock, 2007a, p. A-2). The potential implications of this limited line of thinking are very real, but it overlooks the important role of one-to-one consultations in the embedding process.

Ruth Keimig’s 1983 model of learning improvements is still useful for our purposes here. She presents a guide for effective programs which includes a hierarchy of learning improvement programs that describes and ranks four types of programs ranging from broad generic remedial courses to focussed comprehensive learning systems (Figure 1) and she suggests that:

it is increasingly recognized that generalized approaches to remedial and tutorial-assistance are less likely to be effective than those targeted at specific aspects of learning within the academic courses in which the need for knowledge or skill becomes apparent. (p. 21)

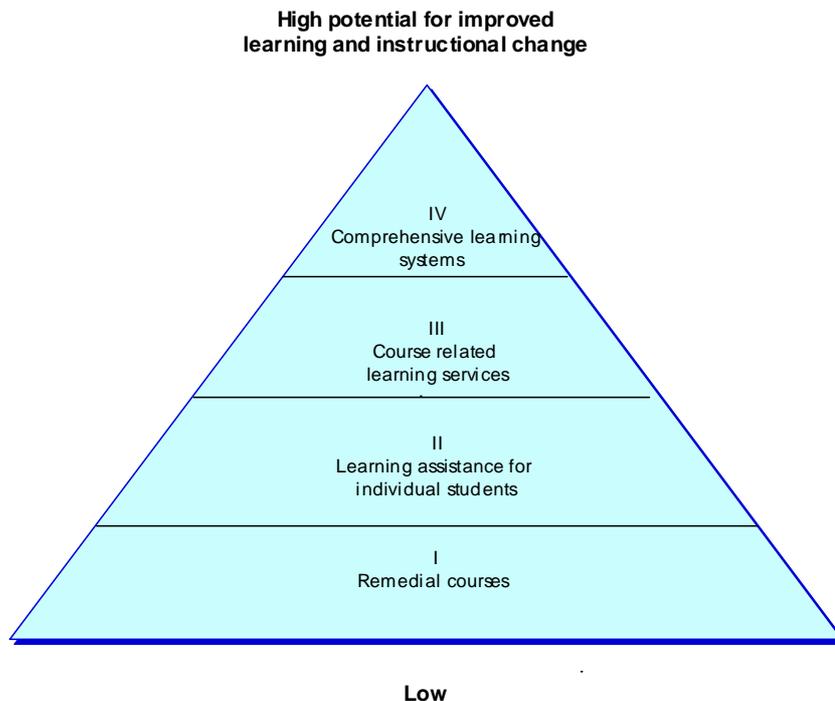


Figure 1. The hierarchy of learning improvement programs (Keimig, 1983, p. 21).

Comprehensive learning systems provide for the total learning needs of students, and are conceptualised with students' needs and attitudes in mind. Keimig (1983) provided an extensive list of variables for learning improvement programs and academic numeracy which would become part of such a comprehensive learning system. These included goals, objectives and rationale; instructional methods and content; institutional policies and standards; professional and paraprofessional staff and roles; and evaluation of learning improvement programs. However the broader lower level programs must be in place and integrated into the academic mainstream to provide the extra learning when needed within more specific programs or courses. They also provide valuable information for learning advisors about the learners.

We believe the benefits of one-to-one consultations with students are multifaceted, and work on a number of levels:

1. at the student level in response to conceptual "stuck places";
2. through student scaffolding for learning;
3. through affect and development;
4. and at the lecturer level with course and assessment analysis.

We will examine each of these in turn.

2.1. Benefit 1: Stuck places

At one level "stuck places" can be related to threshold concepts. Meyer and Land (2005, 2006) explain the notion of threshold concepts as conceptual gateways that lead to previously inaccessible and troublesome ways of thinking about something. These gateways may be "*transformational* (occasioning a significant shift in perception of the subject), *irreversible* (unlikely to be forgotten), and *integrative* (exposing the previously hidden interrelatedness of something)". They may also be *bounded* (bordering with new conceptual spaces) and *troublesome* (Meyer & Land, 2005, pp. 373-374). Meyer and Land use examples of depreciation in accounting or the central limit theorem in statistics and complex numbers and the limit theorem in mathematics as examples of threshold concepts. They also refer to *liminality* (being within the troublesome space). Liminal states have three characteristics (pp. 23-24). First they may be transformative (change in state or status). Second, there may be a power dimension as learners gain new knowledge and status in the community. Third, there may be oscillation between states, with regression to earlier status. Moreover, in 2006, Meyer and Land suggested there may also be pre-liminal states where there was variation in students' tacit understanding of a threshold concept. All of these states can be examined in one-to-one consultations. While in academic literacy, it may only apply at the general conceptual and metacognitive level, in mathematics and science, staff must recognise and scaffold student learning for these conceptual stuck places. This is not to say the tutors purely teach concepts in engineering or economics, but in a majority of cases it is the underlying mathematics prerequisite concepts that are lacking (e.g. knowledge of gradients in economics to understand rates of change, and deep and broad understandings of fractions to manipulate algebraic expressions).

2.2. Benefit 2: Scaffolding student learning

For academic language, the scaffolding benefit often relates to international students and the specific issues they face in an Australian context, despite Kirkpatrick and Mulligan's (2002) valid point that every student's transition to university could be considered a cross-cultural experience. As Woodward-Kron (2007, p. 253-254) notes, "researchers as well as students have argued that [international] students' educational, linguistic and cultural backgrounds can disrupt the socialisation process of coming to terms with the writing requirements and academic culture of Western universities". Especially with regards to non-English speaking background (NESB) students (including Australian NESB students), "individual writing consultations are sometimes conceptualised one-dimensionally by faculty as a form of editing" (Woodward-Kron, 2007, p. 253). Indeed, faculty often send NESB students to a learning advisor to get their work edited or 'fixed', as this is not seen as a part of their responsibility and moreover as separate from the

course content. Doherty and Singh (2005) see this as part of a common attitude in Western universities, which creates a strict binary between Western institutions and “Other” education systems. In other words, “fictionalised differences between Western and ‘Other’ pedagogues, Western and ‘Other’ education systems, are imagined, launched, and enacted as stabilising devices or mechanisms during periods of intense cultural instability, fluidity, and complexification” (Doherty & Singh, 2005, p. 66). As universities are currently going through a period of profound instability and complexification, it comes as no surprise that this attitude in practical terms translates to sending the “Others” to a learning advisor to bring them “up to speed” with Western expectations.

However, while the attitude behind it is fundamentally flawed, the one-to-one consultation itself can be highly valuable for the students thus referred on. Woodward-Kron’s (2007) account of the kind of *mutual* learning that occurs during such consultations is illuminating in this respect. She discusses a “dynamic exchange during which a range of meanings were negotiated” and during which “the advisor scaffolded the student’s academic writing and learning in a number of ways” (Woodward-Kron, 2007, p. 254). Such cases, which are highly recognisable for learning advisors, are often characterised by a series of follow-up consultations during which such scaffolding takes place for as long as the student benefits from it. Importantly however, the meanings that are negotiated during these consultations are not a “one-way street”, but rather a part of a mutual learning experience, during which the learning advisor gains valuable insights into the kinds of issues international students struggle with in their adaptations to Australian universities. While the focus of this example is on international students, the dynamic exchanges referred to here are by no means restricted to international students alone, but equally apply to domestic students. In mathematics, if we use the (albeit inadequate) metaphor of mathematics as a language, then many of our students have inadequate language skills. They are unable to see the structure of this language (e.g. algebraic expressions) and understand deeply the connecting meanings underneath and between these expressions (e.g. the relationship between graphs and the equivalent equations). Unfortunately, from our experience the insights gained through such exchanges may currently not be capitalised on, and may therefore often be “wasted”, rather than transferred to course and program development.

2.3. Benefit 3: Affect and emotion

The third benefit we focus on relates to the more intangible role of affect and emotion in learning and teaching. This role is difficult to measure in a clear-cut way, and is therefore often neglected in discussions about accountability and reliable learning outcomes. In mathematics, while it is an acknowledged important variable in successful student learning, the nature of this interaction “between affect, teaching and learning, and causal directions found in relationships between affective and cognitive learning factors is inconclusive” (Cretchley, 2008). However, as Antonacopoulou and Gabriel (2001) argue, emotion and learning are “interrelated and interactive and interdependent” (p. 435). Moreover, “far from being irrational, emotions are often associated with practical, conscious judgements that are designed to result in specific outcomes” (Crossman, 2007, p. 315). Again, learning advisors know this instinctively, and it can be seen as an integral part of the on-to-one consultation, during which not only learning is scaffolded, but also self-confidence built in an emotional environment that is often “safer” than the lecture or tutorial context. The case studies in this paper in both language and mathematics reinforce this. As Vincent (2004) warns, “the aestheticised language of traditional academia [and indeed the ‘new university’] serves to mask and contain desire, rage, love and passion that provide the very impetus for truth seeking in the first instance” (p. 113). In this context, it is ironic that truth seeking is fundamental to what we want students to do in universities, which would suggest that we ignore emotions at our peril. As Crossman (2007) argues, “relationships between students and teachers have far-reaching effects, possibly influencing learning experiences many years ahead of an original interaction” (p. 324). The role of emotions is central to this, and the one-to-one consultation has the potential to nurture lifelong learning by providing a safe environment in which lifelong learning habits can be developed. But to argue this case convincingly, as well as to argue the value of insights gained from such consultations for course and program development (Taylor & Galligan, 2002), requires learning advisors to

seize the initiative by providing as much evidence of these benefits in as many academic fora as possible. The case studies that follow, based on evaluations of one-to-one consultations, are a step in that direction.

2.4. Benefit 4: Course and assessment support

Insights are gained during consultations about particular courses and programs, and specifically about particular assessment items and learning materials that cause problems for some students. These insights can be used for program and course development and improvement, if they are tapped into by faculty staff. But as Chanock (2007b) argues, “what is lacking is regular institutional means of bringing us into the same conversations, to share what we know on a basis of mutual respect” (p. 274). At USQ, this has recently changed to some extent through the establishment of the Learning and Teaching Support Unit (LTSU) in 2006, in which academic developers and academic learning advisors (both for language and mathematics) were brought together, and institutionally linked, as teams, to particular faculties. Although the links are not seamless as yet, this has gone some way in facilitating a direct and continuous line of communication and professional respect between faculty staff, learning advisors and academic developers.

In all these cases, to capitalise on the four benefits of one-to-one consultations outlined above, requires a careful reconsideration of the role of learning advisors. In other words, it needs a model which includes a seamless link between learning advisors’ roles in one-to-one consultations, and their roles in program and course development. For this to happen, learning advisors need to take the initiative and provide strong evidence-based arguments in favour of such a model, and to disseminate these arguments as widely as possible. Careful and consistent evaluation is vital to this process.

3. The evaluation

In Semester 2 of 2006, 206 appointments were held in mathematics support and 267 in academic writing. Of these, 83% were face-to-face; 20% were with external students; and 41% were with international students. From 28 August to 8 September, an evaluation was undertaken over a 2 week period. The evaluation (based on Chanock, 2001, 2002; Maxwell, 1993) involved three main tasks:

1. Questionnaires undertaken over a 2-week busy period to provide detail on the teaching and learning taking place (Appendix A);
2. Tutor logs completed by each tutor (over the same 2 weeks) which included the aim of each session, a sketch of what was covered, and comments about the session by tutors and students;
3. Chronicles kept of significant incidents which highlighted objectives or showed where improvements could be made and/or case studies which were representative of the routine of teaching.

In total, 55 students (70% participation) completed a questionnaire for maths (21/17 bookings and 2 group sessions (9 in each, and 6 extra) and language (34/38 bookings). The level of satisfaction was generally high. The following conventions are observed in the excerpts presented from the questionnaires and logs. Tutors are identified as Tw (academic writing) or Tm (mathematics), and students are numbered (from 1 to 55); for example Tw1:7 is one of the academic writing tutor’s logs referring to student 7.

4. Case study 1: Academic writing

4.1. Student learning issue: Critical analysis skills (benefit 1 – “stuck places”)

Many students present for one-to-one consultations because they lack confidence in their ability to succeed at university. This lack of confidence can in some cases be linked to Meyer and Land’s (2005) argument about thresholds and liminality. International students in particular

have been thrust into a period of intense change. Their western lecturers expect critical analysis and thought which many, even post-graduate students, have had no experience with. Many have passed numerous courses using the skills of summary and description alone. Their lack of experience with critical processes means that skill development in this area needs to be scaffolded, ideally into courses. With the notable absence of this process, units like USQ's Learning Centre are the students' salvation. Here they have the opportunity over a number of sessions to develop skills needed for particular assignments.

The university sector demands analytical engagement from its students, but the skills to do this are not always scaffolded into course work. The quotation below from a tutor's log exemplifies a lack of this level of critical engagement:

The main issue is that he describes what other people think in a disjointed way, without taking a position in relation to it, or without necessarily understanding what he quotes. We discussed what critical analysis means, and I gave him a series of questions to take home and answer, before revising his essay. These questions were designed to arrive at a thesis statement. We discussed the importance of knowing where you stand in relation to theory. (Tw1:7)

An issue adjunct to this is the perception students have of their problems and how this compares with their tutor's perception. With the pressure placed on students by many lecturers regarding their grammatical structure, many students believe that their problem centres on this and it becomes a source of anxiety and in some cases paranoia. Snapshots of the actual sessions such as the teacher log below from the evaluation however indicated that there are often other issues involved.

The student requested that I check her assignment structure and her grammar. The student's assignment was on a very broad topic. Because it was so broad, she seemed to be uncertain of exactly what direction she had taken in her assignment which was largely completed. The student wasn't really able to tell me what the main ideas of her assignment were or what she was trying to say. We therefore needed to backtrack to discuss thesis statements and main points and the introduction. We concentrated on trying to determine the focus of her essay and how to present it logically. (Tw4:7)

A crucial element of one-to-one consultations is that they provide insight into problematic assumptions made by students regarding their writing and glimpses of communication breakdowns between students and lecturers that result in "the unsuccessful aspects of students' texts" (Pardoe, 2000, as cited in Chanock, 2007b, p. A-3).

4.2. Student learning issue: Writing with confidence (benefit 2 – scaffolding: international students)

Most university students face a period of adjustment to academic culture. Evidence suggests that the dialogue established with a tutor during an individual consultation assists the student's academic writing development (Craswell, 1995; Clerehan, 1996; and Chanock, 1999; all cited in Woodward-Kron, 2007). The transition period is even more challenging for NESB international students (Handa & Fallon, 2006). The students who identified as International commented frequently on the need/desire to have their grammar checked. The words "need", "worried", "help" recurred. For example, in response to Q3, "What prompted you to come for this consultation?", one student responded: "I'm worried about grammar" (Student: S22).

The session basically amounted to reassurance that she was mostly on the right track. She was worried that she hadn't structured it correctly, and we had a lengthy discussion about critical analysis. Many students at this level (particularly international ESL students) are somewhat reluctant to voice their opinions, or unsure what constitutes their "own" opinion. She also voiced frustration with the lack of detailed comments she receives as feedback, as she wants to improve but is often unclear how to. (Tw1:1)

These international students tended to lack self-confidence and at the same time believed that their lecturers lacked confidence too in their ability as students to write well in English. This often stems from a perception held by many Western academics that NESB international students are poor writers and plagiarise deliberately (Handa & Fallon, 2006). However, many international students have issues with understanding course content in an “alien” language as well as a lack of knowledge of Western academic conventions (Handa & Fallon, 2006).

The student was hesitant to replace an abundance of direct quotes with paraphrasing, seemingly due to a lack of confidence with English as second language. I gave her some strategies for addressing this as well as reassurance. (Tw2:1)

4.3. Student learning issue: Negotiated meaning (benefit 3 – affective domain)

In an individual consultation conducted face-to-face, affect and emotion are intrinsic. Two people sit in close proximity for up to forty minutes discussing the student’s concerns with study. This may then be repeated any number of times with this tutor or another if the student requests other consultations as is so often the case. For example, in The Learning Centre survey (for both mathematics and academic writing), 45 (82%) students stated that they planned to come again soon (see Appendix A). While the academic aspects of the consultation are the essential catalyst for the session, the rapport that is developed is an integral part of the consultation and the results that stem from it are couched in affect. Forty-seven (85%) of the students surveyed indicated they felt better equipped to do their next piece of academic work after their consultation (Q9). Forty-five of them (82%) believed that the tutor answered their questions, explained things clearly and focused on their needs (Q8).

Individual consultations provide a comfortable and safe forum for students to clarify the meaning of a task or a lecturer’s comment (Woodward-Kron, 2007). In the sessions, the focus is often on the “grammar”, yet the consultation is about much more. The survey documents the depth of tutor-student interaction, with the following replies indicating what students perceived to apply to their specific sessions by ticking the relevant boxes (see Appendix 1). From 55 responses in total, 36 ticked “listened to me”, 32 “asked me questions”, 40 “corrected my work”, 36 “offered strategies I can use later by myself”, 21 “gave me support materials”, and 7 “recommended other material”. As tutors are not content experts, consultations cannot involve straight editing or “correcting of work” – meaning must be discussed. Format and content are intersecting areas; tutors negotiate meaning with students. Consultations are therefore generally interactive and dynamic (Woodward-Kron, 2007). Suggestions on format are made by tutors as they seek the student’s agreement, reaction or explanation regarding the content, until meaning and understanding are jointly established (Woodward-Kron, 2007).

This student has come in before too. She has returned to university after a few years absence. She is hard working and it takes her a long time to get the language part of her assignments right. This results in some anxiety. But her writing is eventually good. I see the follow up session primarily as providing reassurance and thus reducing the anxiety levels. (Tw1:2)

While marginality can be seen as a barrier to the voices of learning advisors being heard in discipline areas, for some students who seek one-to-one consultations, it fosters an atmosphere of security from which they can unburden their course concerns. The sense of freedom or release allows them to speak freely about their studies and the issues as they see them. Talking with a sympathetic yet proactive “outsider” can contribute to an increased sense of understanding of the “bigger picture” of study which in turn can heighten their sense of purpose and even allow them to feel more in control of their journey.

Student had a very traumatic academic (failed courses) and personal life (divorce) last year. He was recommended to TLC and to date has taken advantage of anything TLC has to offer. Student’s work (written skills & ability to interpret task) improving & it’s good to see him looking happier. Says he feels more in control!

[NB. - I was pleased that student did actually contact the tutor with his queries, and brought this info with him to the follow up session the following week.] (Tw3:8)

4.4. Student learning issue: Question analysis (benefit 4: course and assessment analysis)

This is the domain where the role of the learning advisor and tutor becomes rather complex, and yet this is also the domain where the opportunities to improve course and program design become most pronounced. Our dual roles as both learning advisors and academic developers in the Learning and Teaching Support Unit at USQ places us in a unique position to evaluate assessment items in courses, as we see the direct impact such items have on individual students. However, we also walk somewhat of a tightrope, as students tell us about such assessment items in a context of strict confidence and trust, which necessitates a careful degree of diplomacy on how to feed such information back to the relevant lecturer. We have yet to develop a satisfactory process to make this happen. In most cases, students come to us in the Learning Centre with specific assessment items. In many cases, they have serious problems understanding what they are expected to do, and in some cases we have considerable difficulty ourselves trying to ascertain the exact requirements of some pieces of assessment. In addition, we have at times severe reservations about whether particular assessment items are appropriate for the expected performance level of students in certain courses. The question in such cases becomes: how do we feed such evaluations back into course development processes, and in particular into assessment design. In short, while our role as learning advisors affords us privileged access to student engagement with course materials, it is politically difficult to take full advantage of such insights gained. However, it is vital that we develop a process to facilitate the closing of such a potential feedback loop, so that the insights gained can feed back into course development, as this is an area where we can capitalise on our work in a one-to-one context, and embed in courses and programs scaffolded academic skills development that is based on evidence.

5. Case Study 2: Mathematics

Many of the issues in case study 1 also apply in mathematics support. Students lack confidence and have difficulty with the transition to university culture. These one-to-one sessions provide the insight into student learning in an atmosphere of security. However, mathematics learning advisors have mathematics content knowledge in many of the conceptual stuck places where students find themselves.

5.1. Student learning issue: Prerequisite skills (benefits 1 and 4 – stuck places and curriculum development)

The following extract is from the journal of a mathematics learning advisor in a one-to-one consultation with a first year nursing student undertaking a medical calculations course. In this course there had already been some contact between the academic learning advisors and the lecturers. Support had already been provided in terms of a two day in-context mathematics course at the beginning of semester and a “self-test” in basic mathematics skills where students were asked to complete a test and then self-mark it in an online environment where there was available material to explain the concepts further (Taylor, 1998). One-to-one support was then available in the Learning Centre.

(23 August) This mature aged student came to TLC straight after the tutorial I went to where I gave a maths test to them. (+ a session in the evening) She had done some of the test – but hadn’t marked it. Some of the things she couldn’t do included finding average (but was ok once I went through it). Calculations using decimals – appeared to have limited knowledge of moving the decimal point. She also was very unsure of the relationship between $\frac{3}{4}$ and $3 \div 4$. When she turned $\frac{3}{4}$ to a decimal she had 7.5. With $7.42 \div 100$ she would use long division to do it. When saying these divisions

she would not be sure whether to say 7.42 divided by 100 or 7.42 divided into 100. This occurred a number of times. Even 0.5 as a fraction (1/2) she was unclear about. When I put this in a money context – she was then able to see it. Turning 1.2 hours into minutes she was not able to do (this is relatively common). She didn't know 1000 mL = 1 Litre (until prompted and put in context) and again converting from mL to L and g to mg – we spent a lot of time working on this and the how and why of this algorithm. We also went through how to do $10/4 = 8/x$ (this is a common problem) but her problem was also how to turn the 10/4 into 2.5.

She is quite determined and she seems to have good study skills.

(25th Aug) met her briefly in TLC and she said she had been working hard on these and showed me the work she had done (Tm2:1).

In late 2006, a team from the Department of Mathematics and Computing, the Faculty of Arts, and from LTSU were approached to assist the Department of Nursing to develop two half-credit point courses in Building Professional Nursing Attributes for 1st year, 1st semester undergraduate courses (Galligan, Loch, & Lawrence, 2008; Lawrence, Loch, & Galligan, 2008). These attributes included academic literacies relating to language, information technology and mathematics, and study skills. By becoming involved in these courses, LTSU moved from Keimig's (1983) hierarchy Level 1 and 3 to Level 4 (while still maintaining Level 2). The above journal extract (Tm2:1), is very typical of other student consultations in this area of medical calculations. One-to-one sessions such as these were invaluable in understanding students' fundamental difficulties with essential mathematical concepts. These sessions create moments where misunderstanding can be captured or the troublesome knowledge and the state of liminality can be detailed. This in turn has led us to develop in-context mathematics curriculum materials specifically related to nursing. We have been able to develop these concepts using computer software (Camtasia and a Tablet PC) to capture and record how to move decimal points; how to change from decimal hours to hours and minutes; and how to rearrange formula such as the one described in the journal.

One-to-one consultations such as these are rich sources for looking at threshold concepts. Threshold concepts exist at any level of mathematics learning. In nursing, proportional reasoning, percentages, and conversions of units all contain threshold concepts, some of which are very troublesome to many learners. When students are in this troublesome space, (i.e., liminality) there is evidence of transformative liminality (change in state or status – perhaps becoming aware of how drug calculations are solved; even acting like a nurse). Second, there is evidence of a power dimension as learners gain new knowledge and status in mathematics as nurses who can “do” the drug calculations. For example, in a later study (Galligan, Loch, & Lawrence, 2008) a comment from a nursing student in The Learning Centre was: “I feel great when I can solve these problems”. Third, there is also oscillation between states, with regression to earlier states. In another journal entry a first year mathematics course student said: “I thought I understood this (i.e. the need to check) when I was with my tutor, but I didn't and he wrote on the white board ...”. The student then came to the Learning Centre to go over it again, this time recorded with Camtasia and the tablet PC. Pre-liminal states could also be seen where there was variation in students' tacit understanding of a threshold concept (i.e. personal and implicit). In the example above the student had tacit understanding of decimals in the context of money but could not transfer this to another context.

5.2. Student learning issue: Understanding a difficult concept (benefit 2: scaffolded student learning)

In mathematics assistance, scaffolding often takes place where students need to understand mathematical concepts as well as interpret word problems. In this first example this tutor goes

through a concept called “completing the square”. For mathematics tutors, it is a common issue, but the one-to-one session provides better insights:

Show through simple factorizations, the complete square and the relationship between constant and coefficient. Use less complex method than shown in the text, whereby variable that is to be factorized is separated prior to completing the square. Method chosen seems to help students, as it draws on skills that they are familiar with (Tm1:24).

This particular incident, together with our prior experience from previous sessions, allowed us to develop a short teacher talk video that we made available online.

Another common form of scaffolding is assisting students to read and interpret assignment or other questions and assist them with study skills:

Student required help with second (statistics) assignment ... See if student could interpret the assignment questions ... Point student to “key” words in the assignment, eg. “probability” and then suggest that they review lectures dealing with probability ... Had to gently suggest that the student attended tutorials and also attended our regular Tuesday evening support session. (Tm1:50).

These sessions often alert us to difficulties students have in interpreting dense mathematical text, which has been highlighted in mathematics education literature as a factor in students’ difficulty with word problems (MacGregor, 1993). Students can also be unfamiliar with university study environments, and faculty staff may be unaware of their students’ unfamiliarity. Learning advisors specifically outlining the benefits of attending tutorials and suggesting strategies to participate in tutorials, can assist students to engage in learning.

5.3. Student learning issue: Affect as a barrier to learning mathematics (benefit 3 affect and emotion)

In a Learning Centre environment, affect appears to be a key factor in students’ success. In this atmosphere, students often talk about their past mathematics experiences. In 2008 this was a statement from a student who came to the Learning Centre:

I dislike maths if I can’t apply it to nursing only. I put up a mental block, due to horrific childhood teachers who convinced me, and told my parents, I wouldn’t succeed due to inability to concentrate on it, brought about by put downs in front of students and refusal to give one-on-one direction in junior school, even had a private tutor to help me overcome this. Still block out times tables.

While there were not many comments by students in the 2006 mathematics evaluation, the ones that were there were often related to affect. These comments reflect the earlier ones in academic writing where students feel safe in this atmosphere of security which the Learning Centre provides, and in this context they can speak more freely about their studies and related issues:

It’s great that you will not be judged and no question is silly. (S16)

Tutor encouraged me and gave strategies on how to improve. (S18)

Always helpful – never intimidating. (S18)

6. Conclusion

This paper has addressed an important challenge: to develop an evidence-based case to demonstrate the crucial relationship between individual and group teaching. Continuous evaluation of the work of learning advisors in one-to-one teaching contexts is one step in that process. Careful analysis of the data thus gathered helps us to demonstrate that such a relationship exists, but it also helps us to identify and think about how such a relationship can be exploited to improve curriculum design, which would ultimately benefit students well beyond the cohort that accesses learning advisors. The central argument here is that the development of academic skills

is most effective when it is integrated into course design, as this removes it from the deficit model in which students need to seek additional help to overcome “their deficit”. Such a model places the responsibility to overcome this deficit squarely on the student, while this paper argues that developing and improving academic literacy and numeracy skills should be seen as a shared responsibility between teachers and students. Learning advisors can play a crucial role in this, as they are in a unique position to mediate between student needs and appropriate course design, especially when they perform a dual role of both learning advisors and academic developers. Evaluation of one-to-one consultations has shown the complexity of student needs, and this paper has identified four levels of this complexity: conceptual “stuck places”, student scaffolding for learning, affect and development, and course and assessment analysis. To return to Kate Chanock’s (2007) challenge, it is up to us as learning advisors to not only provide evidence of the importance of one-to-one consultations, but to also develop effective ways to communicate the insights we gain to the wider university community. If we can rise to this challenge, the benefits will stretch well beyond the relatively narrow context of one-to-one consultations to seriously improve the student learning journey across the board. This paper has provided a first step in this important process.

Appendix 1*: Student Questionnaire for The Learning Centre (TLC) – S2 2006

Please complete this questionnaire.

- Do not write your name on this sheet.
- Please answer each question by marking the boxes with a cross ☒.
- It would be very helpful if you comment further where appropriate.
- Please clarify any questions with a tutor in TLC.
- Drop the completed questionnaire in the Assignment Box located in Reception.

1. Is this your first visit to TLC?

Yes

No

2. How did you find out about TLC?

Friend(s)

USQ brochure

Orientation session

Lecturer or Tutor

Other (please explain).....

3. What prompted you to come for this consultation?

Recommended by lecturer or tutor

Can't get started on my assignment

Need assurance I'm on the right track

Received a low mark for last assignment

Other (please explain)

.....

4. Did you prepare for this consultation? For example, bring questions for the tutor?

Yes How?

.....

No Why not?

.....

5. From your point of view what were the main features covered in the consultation?

Language

Maths/Science

Question analysis

Question analysis

Paragraph structure

Pre-requisite maths/science

Essay structure

Specific course content

Report structure

If your consultation was

Clarity of expression

about Maths, did it cover:

Grammar error analysis

Algebra

Referencing

Arithmetic

Reading strategies

Calculus

Other (please explain).....

Graphs

.....

Statistics

Calculators

Other (please explain).....

.....

6. What did the tutor do? (you can mark more than one box)

Listened to me

Asked me questions

Corrected my work

Offered strategies that I can use later by myself

Gave me support material(s)

Recommended other material

Other.....

7. What did you do in the session?

.....
.....
.....

8. Based on this session, did the tutor: (circle one for each below)

- (a) Answer my questions **Mostly** **Sometimes** **Not at all**

- (b) Explain things clearly **Mostly** **Sometimes** **Not at all**

- (c) Focus on my needs **Mostly** **Sometimes** **Not at all**

Further comment
.....
.....

9. Based on this session, do you feel better equipped to do your next piece of academic work?

- Yes Comment further

- No Comment further

10. Do you plan to come again soon?

- Yes Why?

- No Why not?

11. Do you have any other comments about The Learning Centre?

.....
.....
.....
.....

12. Please provide the following details:

Faculty
Course Code.....

Thank you for taking the time to complete this questionnaire.

*Please note: the design of this evaluation form served a small pilot study, and is therefore still subject to changes for continuous improvement. It should not be adopted as is, but rather adapted to suit the needs of specific institutional contexts.

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