

# Back to the future with old-fashioned conversations: building relationships and individualising support with educational technologies

**Eva Heinrich**  
Massey University,  
New Zealand

**Jenny McDonald**  
Centre for Learning and Research in Higher  
Education, University of Auckland,  
New Zealand

Recent advances in ICT have had a profound effect on tertiary education. However, critical and social theorists caution that the relationship between teacher and student is still central and educational research over many years suggests that some of the most successful pedagogical methods are those which strengthen the relationship between teacher and student and which support student development of relatedness, competence and autonomy. In this paper, we propose a new approach to course design and organisation which builds on lessons from the past while taking advantage of the affordances of contemporary technology. We summarise data from interviews with teachers and learning support staff and conclude with our hopes for the future.

Keywords: STEM, first year teaching, personalized system of instruction, Keller plan

## Introduction

In university teaching of undergraduate courses and in particular, first year STEM course teaching, it is worth reflecting on the past, asking what has changed, what has been achieved and what directions teaching could take in the future. Our focus in this paper is on a proposal for the future, grounded in solid evidence from the past, about what works in tertiary learning and teaching. Thus far, we have sought feedback on our proposal from a small group of educators; the next step will be to seek input from students.

Advances in communication and information technologies have had a profound effect on tertiary education. While wholesale adoption by institutions and educators within these institutions takes considerable time, some technologies have become firmly embedded. Learning management systems (LMS) are leading the way, with close to 100 percent of institutions embracing LMS and use among teachers and students in the 80 percent range (Brown, Dehoney, & Millichap, 2015). New technological developments continue to challenge the education sector. The 2017 NMC Horizon Report names adaptive learning technologies and mobile learning as having current impact, the Internet of Things and next-generation LMS as challenges for the next few years, and artificial intelligence and natural user interfaces as technologies with a four to five-year adoption timeframe (Becker et al., 2017). The report also names significant challenges surrounding the adoption of technology. Among those are the disparity in learning outcomes for students from varied backgrounds, the advancement of digital equity and the need for rethinking the role of the educator (Becker et al., 2017). These challenges highlight the crucial role of human factors in the adoption of technologies. Notwithstanding practical, efficiency and related pedagogical gains from technology adoption, Tamin and Bernard (2011) remind us that 40 years of educational technology research has, overall, left us firmly on the fence in terms of demonstrable learning gains.

Accepting that teaching and student learning are intimately related, it is worth reflecting on the advice of Biesta (2013, p42) that, “the gift of teaching ... depends on the fragile interplay between the teacher and the student”. How do we strengthen that ‘fragile interplay’ so that the ‘gift of teaching’ can be realised for all students? If Hattie (2015) is correct, then about 20-25% of the variance in learning outcomes at tertiary level is within the control of the teacher. In other words, what teachers do, from course planning and design to classroom interactions and feedback, matters. And yet, perversely much of the focus on learner-centredness and technology enhanced learning may diminish the role of the teacher. For example, Bayne (2015) sees the focus on technology closely linked to market-oriented concerns in education where efficiency is a driving factor. McDonald & Loke (2016) warn of the dangers of casting tertiary teachers and teaching as ‘old’ and ‘negative’ in the context of wholesale promotion of technology enhanced learning. We argue for the need to heed the warnings issued by the social and critical theorists in relation to contemporary educational practice and the focus on technology; the ‘gift of teaching’ is at risk.



This work is made available under  
a [Creative Commons Attribution 4.0](https://creativecommons.org/licenses/by/4.0/) International licence.

Having established that potential danger lurks in the ‘waters’, we renew the search for what works and why with a firm focus on the role of the teacher and personal and meaningful interactions with students. In doing so we by no means argue against educational technologies. To the contrary, we regard their use as a given in today’s blended learning contexts. Our search has taken us back to the 1970s and 1990s, to the work on the Personal System of Instruction (PSI; Keller, 1968) and Self-Determination Theory (SDT; Ryan & Deci; 2002). In the next section we briefly describe PSI and SDT and our plans for their renewed adoption, adjusted to 21<sup>st</sup> century needs. We also draw on interviews with educators that highlight both the importance of the ‘personal touch’ and of supporting technologies. We then shift the focus to the essential role of communication and learning technologies in supporting our approach.

## Drawing on student-teacher conversations guided by PSI and SDT

Our context is the teaching of first year, semester-long university courses in mathematical, science or technology disciplines. We address both on and off campus students. Our approach might also be suitable for other disciplines, such as finance or accounting, as well as for courses beyond first year. The focus is on guiding students towards solid learning skills and subject knowledge that will serve them well in subsequent years.

Specific components of our approach include:

- Variable start and completion times.
- Personal study plan: When starting a course, students have to prepare their personal study plan with support from staff.
- Pacing: It is up to students how they progress through a course. Progress is dependent on fulfilling course requirements. No deadlines are enforced.
- Course material: All course material is provided for self-study in formats such as video recordings or written material. Exercises and review questions are provided.
- To pass a course a student must demonstrate achievement of all learning objectives.
- To achieve a learning objective requires an assessment conversation with a member of the teaching staff. If a teacher decides the objective is not achieved, the student revises their work based on the feedback in the assessment conversation.
- Purpose of the final test: The final test examines the student’s overall understanding of the course material and determines the passing grade a student receives.
- Support: Staff are available for individual student support. Students can seek help via direct contact or class-based tools (e.g., discussion forums).
- Students will be provided with open learning spaces or virtual spaces that can be used for self-study, conversations with peers and occasional group class activities.
- Students will be encouraged to work together on course material and tasks.

Learning and assessment conversations are at the centre. From day one the focus is on building relationships between students and teaching staff as well as among peers. In part this is achieved by assisting students in the development of personal study plans, charting their proposed progress through the course and providing the basis for staff to assist with progress monitoring. Passing a course is based on the achievement of learning objectives. This is tested in assessment conversations with teaching staff, which are requested by students and are held one-on-one. Student and teacher discuss the work the student has prepared in regard to the learning objective. The teacher probes, challenges and extends the student’s understanding. With reference to a marking rubric the teacher decides if the student has achieved the learning objective or needs to revisit aspects of the material. In the latter case the student builds on the feedback received until ready for a further learning conversation. All learning objectives need to be mastered to earn the right to sit a final test that is available on demand. This test consolidates learning across all learning objectives and determines the student’s passing grade (passing all learning objectives gives a pass mark independent of the test). The approach provides the flexibility required to cater for students of diverse backgrounds and study contexts. It puts the responsibility for learning into the students’ court but with appropriate nurturing and support from teaching staff and peers. A side effect of this flexibility is that traditional semester times lose their importance. Some students will complete courses earlier, others may require more than the semester to complete.

Our approach builds closely on the Keller Plan or Personalised System of Instruction (PSI; Keller, 1968) which was highly popular in the 1970s and 1980s. In his reviews of studies that had used experimental methods to compare PSI with conventional courses using other forms such as lecture, lecture-discussion, and group discussions, Taveggia (1976) concluded that PSI is superior. In 1991 Buskist, Cush and DeGrandpre revisited the major research reviews on PSI and confirmed the strengths of PSI compared to traditional methods. At its core, the strengths of PSI lie in insisting on mastery of learning objectives in combination with giving students

feedback and time to learn from this feedback. In their original form PSI courses had no time completion limits (students could continue work on uncompleted units in the next study year). For some students the lack of external pressure led to procrastination. This prompted changes to course designs that counteracted the essential core features of PSI (Sherman, 1992; Buskist et al., 1991).

Our ideal is to stay true to the original concepts of PSI and allow for as many attempts as practical for students to achieve the learning objectives. To realize this, we want to strengthen the learning partnerships between students and staff by putting a stronger focus on shared planning and discussion. In this endeavour we are guided by the research on Self-Determination Theory (SDT; Ryan and Deci, 2002). We strive to create learning environments that support the development of self-regulated motivation through addressing student needs for autonomy, competence and relatedness

Despite solid evidence of its positive impact on student learning the uptake of PSI had declined sharply by the early 1990s. Reasons included a reluctance to change conventional teaching approaches (e.g., insisting that live lectures are essential) and reputational damage done by modified courses violating key PSI principles (Sherman, 1992). Practicalities also contributed to the decline of PSI – imagine carrying out all the bookkeeping and scheduling tasks required for several hundred students with at best rudimentary computer technologies! We undoubtedly have made huge strides in communication and information technologies and should be ready to attack the practicalities.

## **Using 21<sup>st</sup> century learning technologies to support PSI courses**

In the fifty years since the inception of PSI, learning technologies have become common place and LMS have found universal adoption. They function as a course home for students and teachers, facilitate the delivery of administrative information and study material, provide discussion spaces, allow for online tests and management of assignments; in short, the tools for effective facilitation of PSI based teaching are now readily available.

In replacing live lectures, PSI emphasized written, well-crafted study material that students could use for self-study and to work through at their own pace. We now have the technologies to record live lectures, automatically transcribe them and let students stream and review lectures on-demand. We have desktop-based tools to record lectures and demonstrations in our offices, capturing details down to keystrokes and mouse pointer movements. While the technical and creative production values of our material might be relatively low, academics, in general, can master the technologies. The vast majority of our students have access to equipment and internet bandwidth to play the material.

The assignment tools in LMS provide the basis for the PSI assessment conversations. Criteria recorded in marking guides signal to students what they have to achieve. The teacher can record outcomes and feedback, addressing the needs of record keeping and guidance for the student. Using the LMS provides transparency, for students and members of the teaching team. Advanced features, such as recording of audio feedback, open up possibilities. For example, it could be part of the assessment conversation that the teacher records feedback and the student expresses their understanding of what to work on for the next iteration of the assessment conversation. This emphasizes the cooperative nature of the teaching approach and also puts the ball into the student's court, planning the steps they have to take to improve their understanding. As practicalities are important, recording feedback as part of the assessment conversation provides time savings compared to having to formulate and type feedback post-meeting.

Our version of PSI requires a tool for personal study planning. Students are in charge of their own plans but teaching staff require access, to assist with planning advice and to check if students are falling behind their own expectations and require support. While many tools, from calendar to word processing or spreadsheet, fulfil basic requirements, more sophisticated project management tools are also available and may be an option in some situations, e.g. task planning and monitoring in team settings. The ability to setup alerts in all types of planning tools are now commonplace. These can be used to warn both student and teacher of upcoming milestones and potential deviations from the agreed schedule. This fits with the PSI approach of self-imposed deadlines the student needs to take responsibility for.

The days of video conferencing with dedicated systems and complicated setups are largely over for most settings. Desktop and smartphone video conferencing are ubiquitous in social settings. While we are not quite at the same level of adoption in teaching contexts, talking to our off-campus students face-to-face is now very feasible. Using these technologies, we suggest interacting with off-campus students just as with their on-campus

counterparts. One-on-one conversations are easy to setup and provide near to the same level of closeness as being in the same physical room. E.g., Desktop sharing makes it feasible for teacher and student to examine and discuss study material and the student's work together. Group conversations with multiple participants are easy to manage once basic skills are mastered. In effect, online video conferencing brings off-campus students into the on-campus environment.

The PSI approach mandates that students have already achieved a minimum standard (i.e. passed the course) when they reach the final test. This test provides an opportunity to demonstrate excellence as the achievement of learning objectives has already been attested. Delivery of final tests online, typically via the LMS, are a better option than the traditional approach to exams, held in specially prepared venues and supervised by human invigilators. Carefully crafted question banks allow the creation of large numbers of different yet equivalent tests. Students can take the tests on their own devices in their own study environments. Specialised invigilation services are increasingly available and innovation in developing test questions can ensure integrity of the examination process. For example, alternative, media-rich question and answer formats; LMS already provide for test questions that require the student to speak or video their answer. Spreading a few such questions throughout a test would allow staff to verify who is taking a test. Making the timing between question presentation and answer requirement tight would narrow down the option of seeking help from others. Integrity issues aside, such question formats would follow more naturally from the discussions on learning materials held during a course.

Learning analytics have become a hot topic in teaching and learning research in recent years, especially in relation to retention and progression. We see increased potential for learning analytics in a PSI approach compared to traditional teaching. A fundamental issue with learning analytics is that while students who are struggling may be identified, discovering exactly why they are struggling or how to help them to catch up is still reliant on personal contact. Even if issues are identified and can be addressed, students may then face the challenge of having to work on follow-up or additional material in parallel to the material they are already struggling with. The inherent flexibility of the PSI approach makes the information learning analytics can provide more valuable as the course design allows for the student to catch up.

Finally, newer developments around LMS offer better integration of the types of tools required to fully enable the promise of PSI. The EDUCAUSE Learning Initiative talks about 'next generation digital learning environments' (NGDLE; ELI, 2015). Those systems are to provide component-based approaches that focus less on administrative tasks and instead provide better support for the exploration of new learning models. Key dimensions promised are interoperability and integration; personalization; analytics, advising and learning assessment; collaboration; and accessibility and universal design.

## **Interviews with Educators**

Through a series of in-depth, semi-structured interviews, nine tertiary teachers and student learning consultants, with significant experience in one-to-one interactions with students, provided feedback on our proposal. All nine interviews were transcribed and analysed independently by two researchers who then negotiated and combined their findings. The results echo the literature reviewed and we have documented participant endorsements, cautions and insights with respect to potential implementation. A full report on findings from the interviews is currently in preparation for Ako Aotearoa, New Zealand. In brief, the educators we talked to see potential for assisting students based on their individual needs and for ensuring that students move on with solid knowledge foundations and study skills. In particular, they emphasised the need for clear communication around objectives and expectations as well as the importance of integrating study skill development into courses rather than simply expecting students to arrive with these. There was concern about the potential for procrastination with movable deadlines but it was felt strategies could be put in place to offset this. What came across strongly is the passion educators have for helping students and the satisfaction they gain from direct contact with students.

In terms of learning technologies, the interviewees confirmed the use of a wide range of tools for scheduling appointments, communication and teaching support. In particular it was emphasized that conversations conducted via video conferencing can be as effective as being located in the same room. What is important is to allow time for the initial setup and sorting out of equipment. Especially for repeat conversations the technology merges into the background. The learning consultants see students from wide areas across the university. For repeat conversations it is beneficial to keep notes to provide continuity in giving advice, particularly when students see different advisors. As LMS are course-based they are not a natural fit for keeping such notes. This might be an area where next generation digital learning environments bring benefits.

## Conclusions

Much of our tertiary education has become anonymous. Our learning designs make it too easy for students to stay at a transactional distance. This is less a question of study mode, on- or off-campus, than of not actively seeking the opportunities for meaningful exchange with teachers and peers. In our approach to course and learning design based on PSI and SDT, technologies play an essential role in supporting meaningful conversations and connections between learners and teachers. While we have engaged with educators on this project, we have yet to evaluate the approach with students; this is an essential next step in this research. Finally, our belief is that while essential, technologies should stay in the background and support learning centred on human interactions. By asking for a return to old-fashioned conversations we emphasize relationship building and individualized support. This is what distinguishes local tertiary providers from international anonymous providers.

## References

- Bayne, S. (2015). What's the matter with 'technology-enhanced learning'?. *Learning, Media and Technology*, 40(1), 5-20. <https://doi.org/10.1080/17439884.2014.915851>
- Becker, A., Cummins, M., Davis, A., Freeman, A., Hall Giesinger, C. & Anathanarayanan, V. (2017). *NMC Horizons Report: 2017 Higher Education Edition*. Austin, Texas: The New Media Consortium. <http://cdn.nmc.org/media/2017-nmc-horizon-report-he-EN.pdf>
- Biesta, G.J. (2013) Giving Teaching Back to Education: Responding to the Disappearance of the Teacher. *Phenomenology & Practice*, 6(2), 35-49. <https://doi.org/10.29173/pandpr19860>
- Brown, M., Dehoney, J. & Millichap, N. (2015). What's next for the LMS? *EDUCAUSE Review*, July/August. <https://er.educause.edu/~media/files/article-downloads/erm1543.pdf>
- Buskist, W., Cush, D.B.A. & DeGrandpre, M.A. (1991). The life and times of PSI. *Journal of Behavioural Education*, 1(2), 215-234.
- ELI (2017). NGDLE: 7 things you should know about ... . *EDUCAUSE Learning Initiative*, <https://library.educause.edu/~media/files/library/2015/12/eli7127-pdf.pdf>
- Hattie, J. (2015). The applicability of Visible Learning to higher education. *Scholarship of Teaching and Learning in Psychology*, 1(1), 79-91. <https://doi.org/10.1037/stl0000021>
- Keller, S. (1968). "Good-bye, teacher ...". *Journal of Applied Behaviour Analysis*, 1(1), 79-89.
- McDonald, J., & Loke, S. K. (2016). Discursive constructions of teacher in an educational technology journal. *Australasian Journal of Educational Technology*, 32(5), 77-93.
- Ryan, R.M., & Deci, E.L. (2002). Overview of self-determination theory: An organismic dialectical perspective. In *Handbook of Self-Determination Research*. E.L. Deci and R.M. Ryan (Eds.), The University of Rochester Press, Rochester, USA, 3-33.
- Sherman, J.G. (1992). Reflections on PSI: Good news and bad. *Journal of Applied Behaviour Analysis*, 25(1), 59-64. <https://doi.org/10.1901/jaba.1992.25-59>
- Taveggia, T.C. (1976). Personalized instruction: A summary of comparative research, 1967-1974. *American Journal of Physics*, 44(1028), 1028-1033. doi: 10.1119/1.10579.
- Tamin, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F. (2011). What forty years of research says about the impact of technology on learning: A second-order meta-analysis and validation study. *Review of Educational Research*, 81(1), 4-28. <https://doi.org/10.3102/0034654310393361>

**Please cite as:** Heinrich, E. & McDonald, J. (2018). Back to old-fashioned conversations. In M. Campbell, J. Willems, C. Adachi, D. Blake, I. Doherty, S. Krishnan, S. Macfarlane, L. Ngo, M. O'Donnell, S. Palmer, L. Riddell, I. Story, H. Suri & J. Tai (Eds.), *Open Oceans: Learning without borders*. Proceedings ASCILITE 2018 Geelong (pp. 396-400). <https://doi.org/10.14742/apubs.2018.1960>