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Introduction to the second issue of JALT

Jürgen Rudolph, Christopher W. Harris and Eric Yeo Zhiwei

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While history tells us that it is nothing new when both leaders of nations and captains of industry blatantly lie, one would have thought that the Internet makes fact-checking easier for all. However, in an era of data inflation, many appear to miss the forest for the trees, with populist backlashes across continents and conspiracy theories abounding. Amongst much other pseudoscience, perhaps most unbelievably and a quintessential sign of the times, there are substantial 'flat Earth' societies – as if we would not have the ability to photograph our blue planet from outer space and as if there had never been a Galileo Galilei some 400 years ago!

In a confusing – and confused – 'post-truth' era, it is critically important that we know both about our knowledge and our ignorance, and think for ourselves. We should constantly question what we think we know, and as Harari (2014) emphasises, the great discovery that launched the Scientific Revolution was the discovery of our collective ignorance regarding the most important questions.

In an increasingly complex world, knowledge, alas, has become paradoxical. With our knowledge increasing at breakneck speed, we should understand the world better and better, but the very opposite is happening. Our new-found knowledge leads to faster economic, social and political changes which adversely affects our capacity to understand the present or forecast the future (Harari, 2016).

With knowledge doubling every two years, we know vastly more than we did a century ago. However, with the paradoxical explosion of knowledge, our ignorance is paradoxically expanding even more so: every answer breeds new questions, and we do not know anything relative to what could be known. As Kelly highlights: "The gap between questions and answers is our ignorance, and it is growing exponentially" (2016, 283-284).

The danger of information overload is that we lack the wisdom to know that we do not know. As Isaac Asimov wrote: "The saddest aspect of society right now is that science gathers knowledge faster than society gathers wisdom" (cited in Kaku, 2012, 405). Unlike information, wisdom is not likely to be dispensed via blogs and Internet chatter. Perhaps we would all heed Laozi's advice: "To attain knowledge, add things every day. To attain wisdom, remove things every day" (cited in Kirov, 2015).

In the context of the paradoxical explosion of knowledge and ignorance, it sure sounds like a truism that lifelong learning has never been more important. In a shrill cacophony of noise, it is our sincere hope that our journal contributes to critical thinking about Higher Education, and we remain skeptical of any dogmas and ideologies.

JALT's second issue consists of three peer-reviewed articles, an ed-tech review, four contributions of a more journalistic nature and eight book reviews. The structure of the inaugural issue has thus been maintained. However, the second issue is thicker (hopefully only in the good sense of the word!), as it contains more contributions – a welcome, though most likely unsustainable trend. A new feature is an interview with an educational thought leader (Bror Saxberg), and we were so happy with the extensive interview that we are considering more such interviews with leaders in higher education for future issues.

The peer-reviewed section gets underway with a fascinating contribution by Barrett and Ben. Their article investigates whether students' concerns about inter-rater reliability are justified in a quantitative case study, and investigates five rater errors that can largely be addressed via the design of marking rubrics.

We also feel very privileged to have a contribution by Stephen Downes whose leadership (together with George Siemens) in the first Massive Open Online Course (MOOC) ever is the stuff of legends. In his contribution, Downes critically evaluates the Canada School of Public Service's online programme development and delivery strategies. The third and final contribution to the peer-reviewed section by Shelley and Goodwin is a more conceptual contribution that questions the overemphasis on quantitative assessment of 'remembered facts' in MBA education. Shelley and Goodwin describe an experiential learning programme that has done away with the teaching of content and that is conducted within an Applied Social Learning Ecosystem (ASLE).

The ed-tech review by Christopher W. Harrris focuses on Gnowbe, a mobile, micro-learning platform that enables learning-by-doing on-the-go. The non-peer-reviewed section with more journalistic contributions is kicked off with a wide-ranging interview with Bror Saxberg from the Chan Zuckerberg Initiative. We have been admirers of Bror Saxberg's deep insights and uncanny ability to connect the dots ever since he was the Chief Learning Officer of Kaplan. We hope you will have at least as much intellectual fun as we did in conducting and editing the interview.

Nigel Starck makes another excellent contribution on "Capitulation, occupation, incarceration, regeneration, education: how Singapore has rediscovered its World War 2 legacy". Matt Glowatz (who like Starck had already contributed to the first issue) discusses the so-called Synergy Pod – Kaplan's interactive classrooms that come with a comprehensive blended learning platform – and how it has assisted him in making his classes more interactive and participative. Concluding this section is another contribution by Christopher W. Harris on the fate of the lecture – is it dead or does it just smell funny (to borrow from Frank Zappa)?

The issue is concluded by eight book reviews. There are two books dealing with matters of language, one on the right use of language and another on classic languages, namely: *Write to the Point* by Sam Leith; and an edited book on

Forward with Classics. Classical Languages in Schools and Communities (both have been reviewed by Nigel Starck). While Palmer's *The Courage to Teach* (reviewed by Leo Kee Chye) focuses on psychological aspects of the teacher, the anthology *Cosmopolitan Perspectives on Academic Leadership in Higher Education* (reviewed by Michael D. Evans) looks at the big, global picture of academic leadership.

Two book reviews take a closer look at educational research: Mills and Gay's *Educational research: Competencies for analysis and applications* (reviewed by Nelson Ang) and Leedy and Ormond's *Practical Research. Planning and Design* (reviewed by Jürgen Rudolph). Finally, Jürgen Rudolph has two more book reviews to his name – both books carry provocative titles and live up to them: Parker's *Shut Down the Business School* and Graeber's *Bullshit Jobs. A Theory.*

Once again, we would like to thank our wonderfully-supportive Editorial Board that has been further strengthened since the first issue; Nic Lim and LuXian Brueschweiler from the exciting tech-start-up Outside for improvements to our website; Associate Prof. Rhys Johnson, COO and Provost for Kaplan Singapore, for his faith in us; Dr Nigel Starck for his deeply-appreciated proofreading of the issue; Associate Prof. Peter Waring, Dean of Murdoch University Singapore, for hosting an inspired Symposium on Applied Learning and Teaching (which is expected to lead to submissions for the third issue) and agreeing to host another one in the second half of 2019; and our academic colleagues near and far for trusting us enough to share this with your networks and students everywhere for engaging in higher education and letting us, your teachers, research on your behalf.

We are excited to end this year with a new baby (the second issue) and look forward to the new year for which there are already three symposia and one conference (EDU2019 in Athens, Greece) in the pipeline, all potentially leading to JALT contributions. Finally and importantly, we welcome all feedback and ideas and aspire to continuous improvement for JALT.

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Evaluating assessment in a School of Economics

Steven Barrett[A]
Francisco Ben[B]

A School of Economics, The University of Adelaide
B School of Education, Tabor College of Higher Education

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Abstract

Previous research undertaken by one of the authors identified a general concern among undergraduate students in large business courses associated with the large number of sessional staff. In particular, students expressed their view in the focus groups with staff their concern that a large number of markers may affect their performance in essay style examinations as a result of the inevitable variation in severity between different raters.

The aim of this paper is to investigate whether these concerns are justified. The focus of this study was the weekly tutorial papers that were submitted for marking by 400 students enrolled in a first year Principles of Microeconomics course. These papers were marked by a team of ten markers whose experience in university teaching ranged from four weeks to over 30 years. 40 per cent of these papers were triple marked by two other raters in order to fully separate the student by rater by item interactions during the subsequent statistical analysis. The results obtained from this triple marking exercise were then analysed using ConQuest 2.0, which uses logistic regression to provide estimates of the parameters of the Partial Credit Model. The Partial Credit Model measures variations in rater severity and four other common rater errors, the halo effect, the central tendency effect, the restriction of range effect and the inter-rater variability or consistency.

The study identified the presence, to some degree or other, of all five rater errors, even among the most experienced raters. The paper concludes by suggesting that the key to improve rater performance lies in the design of marking rubrics.

Introduction

The School of Economics at the University of Adelaide runs a very large first-year principles programme mostly in response to the needs of service teaching in commerce programmes. Over the past decade, about 800 students enrolled in Microeconomics in Semester 1 and a further 300 students enrolled in the subject in Semester 2. On the other hand, about 300 students took Macroeconomics in Semester 1, and a further 800 students were enrolled in Macroeconomics in Semester 2. These two courses are taught using a conventional lecture/tutorial approach. In 2008, it was decided that in order to better align the teaching and learning activities of the School with the graduate attributes of the University, students were required to prepare a written answer to one of the weekly tutorial questions. In total students wrote ten tutorial papers and the best eight were counted towards their final assessment. These questions were marked by the tutors and the results accounted for ten per cent of the total mark for both courses.

Like in many other Australian universities, the School of Economics has responded to increased student enrolments and increasingly tight teaching budgets by increased flexibility in the employment relationships with its teaching staff. Most importantly, the School employs a large number of Honours and post-graduate research students as well as a small number of very experienced casual teaching staff as tutors. However, because of the constraints imposed by the University's Enterprise Bargaining Agreement at the time this research was undertaken, casual staff are only allowed to teach a maximum of five hours per week. So, large classes have a large team of tutors. In this case, a class of 800 students with 45 tutorial classes had 15 tutors.

Previous studies undertaken by the authors suggest that students are concerned when a course involves large numbers of markers (Barrett, 2005). In particular, students are concerned that a lack of consistency between markers may adversely affect their overall grade. However, the literature argues that marker consistency is just one of a number of rater errors that may affect student performance. The aim of this study was to analyse the results of the written tutorial answers for a one semester Microeconomics course, to identify the presence, or otherwise, of rater errors. The marks for these tutorial assignments were analysed using the Partial Credit Model (Andrich, 1978), which is a development of the Rasch Model (Rasch, 1968). Masters (1988) describes the Partial Credit Model as a latent trait or general polychotomous item response model that belongs to the Rasch family of latent trait models. In this study, logistic regression analysis is used to provide estimates of the parameters of the Partial Credit Model, that is rater severity, item difficulty and student ability. Moreover, the outputs of the Partial Credit Model can also be used to identify the presence of five common rater errors. This information can then be used to help raters avoid these errors in the future (Barrett, 2005).

In this project, the rating performance of the tutors involved in teaching this course was evaluated in order to identify the presence, or otherwise, of these five common rating errors as a basis for a course and staff development process. This project was very much a pilot study that was designed to explore these relationships.

This study analysed the rating performance of a sub-set of the tutors that helped deliver a first year Microeconomics course. Due to budget constraints, only 10 of the 15 tutors who were involved in teaching this course were invited to participate in this study. These tutors were chosen on the basis of two criteria. First, the authors were looking for a group of tutors that had the widest possible range of teaching experiences. Indeed, for one tutor (Rater 10) this was her first ever teaching experience, whereas the tutor-in-charge (Rater 2) is a very experienced teacher who has over 30 years of experience teaching Economics at both secondary school and university level. Secondly, in order to provide reliable estimates of the parameters of the Partial Credit Model, the study needed to analyse the ratings obtained from at least 350 students, preferably 400. So, the combination of tutors was chosen that would minimise the number of raters who taught 400 students.

The study explored the concerns that students have about marker consistency by using the Partial Credit Model to detect the presence (or otherwise) of five common rater errors. The following section is a brief review of the five common rater errors that are the focus of this study. The third section is the methods section. The fourth section is divided into three sub-sections and discusses further details of the study. The final section discusses the results of the study and presents the conclusions. This paper concludes that marking guides may not be sufficient to eliminate the five rater errors explored in this paper. Moreover, the paper suggests that these errors may be reduced by the use of marking rubrics. Hence, the paper concludes with a call for further research on this topic.

Five Rating Errors

Previous research into performance appraisal has identified five major categories of rating errors, severity or leniency, the halo effect, the central tendency effect, restriction of range and inter-rater reliability or agreement, which is probably best understood as consistency (Saal, Downey & Lahey, 1980). Engelhard and Stone (1998) have demonstrated that the statistics obtained from the Partial Credit Model can be used to measure these five types of error. This section briefly outlines these rating errors and identifies the underlying questions that motivate concern about each type of error. The discussion describes how each type of rating error can be detected by analysing the statistics obtained from the Partial Credit Model. The critical values reported in Table 1, relate to the rater and item estimates obtained from a statistical package called ConQuest 2.0 (Adams & Khoo, 1993), which is one of a number of commercially available software packages that can be used to analyse examination performance using either the Rasch Model or its extensions, such as the Partial Credit Model. The present study extends this procedure by demonstrating how Item Characteristic Curves and Person Characteristic Curves can also be used to identify these rating errors.

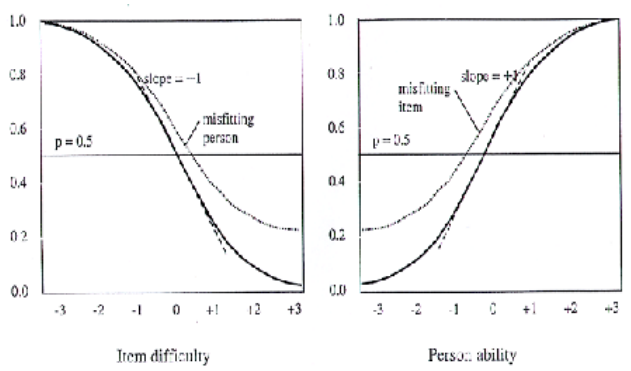

Figure 1: Item and Person Characteristic Curves
(Source: Keeves & Alagumalai, 1999, p.30).

Rater severity or leniency

Rater severity or leniency refers to the general tendency on the part of raters to rate consistently students higher or lower than is warranted on the basis of their responses (Saal et al., 1980). The underlying questions that are addressed by indices of rater severity focus on whether there are statistically significant differences in rater judgments.

The statistical significance of rater variability can be analysed by examining the rater estimates that are produced by ConQuest 2.0 (Table 3 is an example of these statistics). The estimates for each rater should be compared with the expert in the field, or the standard setting judge. In this instance the tutor-in-charge, that is Rater 2, with over 30 years teaching experience, should be considered as the standard setting judge. If the leniency estimate of a particular rater is higher than the expert, then the rater is a harder marker, and if the estimate is lower, then the rater is an easier marker. Hence, the leniency estimates produced by ConQuest are reverse scored.

Evidence of rater severity or leniency can also be seen in the Person Characteristic Curves of the raters that are produced by software packages such as RUMM (Sheridan, Andrich & Luo, 1997). An example is provided in Figure 1. If the Person Characteristic Curve for a particular rater lies to the right of that of the expert then that rater is more severe. On the other hand, a Person Characteristic Curve lying to the left implies that the rater is more lenient than the expert (Figure 1). Conversely, the differences in the difficulty of items can be determined from the estimates of discrimination produced by ConQuest. Table 4 provides examples of these estimates.

The halo effect

The halo effect appears when a rater fails to distinguish between conceptually distinct and independent aspects of student answers (Thorndike, 1920). For example, a rater may be rating items based on an overall impression of each answer, or be distracted by extraneous things such as handwriting. Hence, the rater may fail to distinguish between conceptually essential or non-essential material. The rater may also be unable to assess competence in the different domains or criteria that the items have been constructed to measure (Engelhard, 1994). Such a holistic approach to rating may also artificially create dependency between items. Hence, items, or parts of items in the case of multipart questions, may not be rated independently of each other. The lack of independence of rating between items can also be determined from the Partial Credit Model.

Evidence of a halo effect can be obtained from the Partial Credit Model by examining the rater estimates, in particular, the mean square error statistics, or weighted fit MNSQ. See Table 3 for an example. If these statistics are very low, that is less than 0.6, then raters may not be rating items independently of each other.

The shape of the Person Characteristic Curve for the raters can also be used to demonstrate the presence or absence of the halo effect. A flat curve, with a vertical intercept significantly greater than zero or which is tending towards a value significantly less than one as item difficulty rises, is an indication of the halo effect (Figure 1).

The central tendency effect

The central tendency effect describes situations in which the ratings are clustered around the mid-point of the rating scale and reflects reluctance by raters to use the extreme ends of the rating scale. This is particularly problematic when using a polychotomous rating scale, such as the one used in this study. The central tendency effect is often associated with inexperienced and less well-qualified raters.

This error can simply be detected by examining the marks of each rater using descriptive measures of central tendency such as the mean, median, range and standard deviation, but as illustrated in the fifth section of this paper, this can lead to errors. Evidence of the central tendency effect can also be obtained from the Partial Credit Model by examining the item estimates. In particular, the mean square error statistics, or unweighted fit MNSQ and the unweighted fit *t*. If these statistics are high, that is the unweighted fit MNSQ is greater than 1.5 and the unweighted fit *t* is greater than 1, then the central tendency effect is present. Central tendency can also be seen in the Item Characteristic Curves, especially if the highest ability students consistently fail to attain a score of one on the vertical axis and the vertical intercept is significantly greater than zero.

Restriction of range

The restriction of range effect is related to the central tendency effect as it reflects the reluctance of raters to use the extreme ends of the marking scale. It is also a measure of the extent to which the obtained ratings discriminate between different students with respect to their different performance levels (Engelhard, 1994; Engelhard & Stone, 1998). The underlying question that is addressed by restriction of range indices focus on whether there is a statistical significance in item difficulty as shown by the rater estimates. Significant differences in these indices

demonstrate that raters are discriminating between the items. The amount of spread also provides evidence relating to how the underlying trait has been defined. Again, this error is associated with inexperienced and less well-qualified raters.

Evidence of the restriction of range effect can be obtained from the Partial Credit Model by examining the item estimates. In particular, the mean square error statistics, or weighted fit MNSQ. This rating error is present if the weighted fit MNSQ statistic for the item is greater than 1.30 or less than 0.77.

These relationships are also reflected in the shape of the Item Characteristic Curve. If the weighted fit MNSQ statistic is less than 0.77, then the Item Characteristic Curve will have a very steep upward sloping section, demonstrating that the item discriminates between students in a very narrow ability range. On the other hand, if the MNSQ statistic is greater than 1.30, then the Item Characteristic Curve will be very flat with little or no steep middle section to give it the characteristic "S" shape. Such an item fails to discriminate effectively between students of differing ability.

Inter-rater reliability or agreement

Inter-rater reliability or agreement, or consistency as it is more commonly known as, is based on the concept that ratings are of a higher quality if two or more independent raters arrive at the same rating. In essence, this rating error reflects a concern with consensual or convergent validity. The model fit statistics obtained from the Partial Credit Model provides evidence of inter-rater reliability (Engelhard & Stone, 1998). It is unrealistic to expect perfect agreement with a group of raters. Nevertheless, it is not unrealistic to seek to obtain broadly consistent ratings from raters.

Indications of this type of error can be obtained by examining the mean square errors for both raters and items. Lower values reflect more consistency or agreement or a higher quality of ratings. Higher values reflect less consistency or agreement or a lower quality of ratings. Ideally these values should be 1.00 for the weighted fit MNSQ and 0.00 for the weighted fit *t* statistic. Weighted fit MNSQ greater than 1.5 suggest that raters are not rating items in the same order.

The unweighted fit MNSQ statistic is the slope at the point of inflection of the Person Characteristic Curve. Ideally this slope should be negative 1.00. Increased deviation of the slope from this value implies less consistent and less reliable ratings.

Method

In the course that this study investigated, a total of 795 students were enrolled in 43 tutorials. Due to budgetary constraints, only a sub-set of 399 of these students from 28 tutorial groups and their ten tutors participated in the study. The tutors represented the full spectrum of experience. The tutor-in-charge is a retired secondary school economics teacher with some 10 years university teaching experience and 20 years secondary school teaching experience (Rater 2), another was a qualified high school teacher with more than 20 years university teaching experience (Rater 1), while for Rater 10 this was the first time she had ever taught at university. It was hoped that about 400 students would be involved in the study as 350 students is the minimum number of cases that are required by ConQuest to generate reliable estimates of the parameters of the Partial Credit Model. In particular, the *t* statistics are sensitive to sample size and require a sample size of at least 350. In the end, over 2,500 ratings from 399 students were analysed in this study.

Rater error	Features of the curves if rater error present	Features of the statistics if rater error present
Leniency	Need to compare Person Characteristic Curve with that of the experts.	**Rater estimates.** Compare estimate of leniency with the expert. Lower error term implies more consistency.
Halo effect	Person Characteristic Curve. Maximum values do not approach 1 as student ability rises. Vertical intercept does not tend to 0 as item difficulty rises.	**Rater estimates.** Weighted fit MNSQ < 1.
Central tendency	Item Characteristic Curve. Vertical intercept much greater than 0. Maximum values do not approach 1 as student ability rises.	**Item estimates;** Unweighted fit MNSQ >> 1 and Unweighted fit *t* >> 0.
Restriction of range	Item Characteristic Curve Steep section of curve occurs over a narrow range of student ability or Curve is very flat with no distinct "S" shape.	**Item estimates.** Weighted fit MNSQ <0.77 or Weighted fit MNSQ > 1.30.
Reliability	Person Characteristic Curve. Slope at point of inflection significantly greater than or less than 1.00.	**Rater estimates.** Weighted fit MNSQ >> 1 and Weighted fit *t* >> 0.

Table 1: Summary Table of Rater Errors and Rasch Test Model Statistics

At the heart of the Partial Credit Model is the premise that the performance of a student in essays is the interaction of student ability, the questions or items the student decides to answer and the markers. Hence, the Partial Credit Model uses logistic regression analysis to estimate the three parameters of the model, rater severity, item difficulty and student ability. A priori it would be expected that higher ability students should perform better than students of lower ability. However, if lower ability students choose to answer easier questions, or if more lenient raters mark their answers, then they may outperform more able students. This is the basis of student concerns. So, the aim of the Partial Credit Model is to separate the interactions between student ability, item difficulty and rater severity in order to properly evaluate student performance and rater performance. This separation between students, items and raters can only be achieved if there is crossover between students, items and raters. Crossover occurs when raters mark a range of questions and if they mark the work of students who are in tutorial groups other than their own in addition to their own students.

The tutors were given a briefing session about the project that lasted about an hour. The key part of the briefing was discussing the concept of crossover and why it was so important to this study. All of the tutors marked all of the tutorial questions for all of their students over the course of the semester. Students were required to submit written answers to ten tutorial questions, that is one question each week for Weeks two to eleven and the best eight were counted towards the final grade. Raters did not mark the work of students who were enrolled in other tutorials, so the crossover between raters and items was maximised. But, there was no crossover between raters and students. Thus, the study needed to develop a strategy such that

tutors would mark the papers submitted by students that belonged to tutorial groups other than their own to provide the crossover between raters, items and students that is required to obtain reliable estimates of the model parameters.

The standard response to obtaining crossover between raters and students is for a sample of about 20 per cent of the papers to be double marked by other members of the teaching team (Barrett, 2005). However, Englehard (1994) argued that this approach provides imprecise estimates of the parameters of the Partial Credit Model because some of the statistics are dependent on the sample size. Therefore, in order to produce reliable estimates of the model's parameters around 40 per cent of the papers were triple marked.

All of the tutorial papers that were marked by the ten tutors who took part in this study were photocopied twice prior to marking and around 40 per cent of these papers were allocated to two other tutors for double and triple marking. In the end, the marks for about 1,400 tutorial questions for 399 students were obtained. This is the first round of marking. Then a further 1,100 papers were double marked by a second rater and then triple marked by a third rater. The triple marking process was managed such that no person marked the same paper twice or indeed thrice. Clean papers were provided to the second and third markers so that they had no idea of the marks obtained from the first round of marking. Only the four tutorial questions that were submitted for marking in the second half of the semester were analysed. The tutors were paid to do extra marking. They were paid the relevant marking rate as per the University of Adelaide's Enterprise Bargaining Agreement. The marking was paid for out of a small grant from the School of Economics.

Training was undertaken in two phases. Prior to the initial round of marking, there was a meeting in which the marking guide was given to the tutors and then discussed. Then there was a second meeting prior to the second/third marking. This session was designed to inform the tutors about the project and to help them understand that the analysis was trying to unpack the item, rater-student interactions. There were no ethical issues that require discussion. The project was approved by the University of Adelaide's Human Research Ethics Committee.

The Study

This study investigated the concerns of students about essay marking. In particular, in large classes with large numbers of raters, variation in rater performance can adversely affect student outcomes. In order to ascertain the veracity of students' concerns, this study analysed four tutorial papers, submitted by 395 students and marked by ten raters. The analysis proceeded in three distinct phases. Phase 1 was an examination of the student mark using measures of central tendency. Such an approach is the norm to assess rater/marker performance. Phase 2 analysed the original marks of these 395 students using the Partial Credit Model. Such an approach may provide useful information. But the results will only be indicative due to the crossover effects. The rater by item crossover was maximised as the tutors marked all of the questions submitted by 'their' students. However, there is rater by student crossover. Phase 3 of the study maximised the rater by item crossover and the rater by student crossover by triple marking around 40 per cent of the papers. These results were then analysed using the Partial Credit Model.

Phase one of the study

The evaluation of assessment procedures at most Australian universities tends not to be very sophisticated. Indeed, it is rare "for researchers to consider the complex causal antecedents for observed rater effects" (Wolfe & McVay, 2012, p. 31). Typically, if the lecturer in charge of a large course with a large number of raters became concerned about rater consistency then the evaluation would be rather cursory. The lecturer would probably examine a range of measures of central tendency, such as the mean and the standard deviation. If these measures varied too much then the lecturer might be required to undertake some remedial action, such as moderation, staff development or even termination of those raters whose performance differed too much from the mean.

However, in subjects where students are free to enrol in whatever tutorial suits them, people with similar characteristics tend to be attracted to the same class. So, a tutor may be the only one taking the "after hours" classes, which may be attractive to older, more experienced students, that is, students with higher ability. They may also be more strategic learners and so have more successful strategies for addressing assessment activities. It should therefore not be surprising that this particular tutor's students also perform better. But such a tutor may be labelled "too lenient", requiring remedial action. Remedial action may have severe implications. It is time consuming for subject conveners and sessional staff may lose their jobs for no real reason. Hence, assessment evaluation needs to be undertaken properly and professionally to ensure that a problem exists in the first place.

	Question 1		Question 2		Question 3		Question 4		Average of
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	all items
Rater 1	4.77	1.71	6.00	1.81	7.72	1.93	6.67	2.54	6.25
Rater 2	8.31	1.89	5.95	1.43	9.00	1.06	7.06	1.51	7.60
Rater 3	7.91	2.92	5.73	2.40	7.12	3.72	7.82	2.11	6.95
Rater 4	7.22	1.53	4.38	1.60	7.00	2.55	8.81	1.97	6.80
Rater 5	7.20	1.20	7.08	1.22	8.68	1.80	7.18	1.33	7.50
Rater 6	8.74	1.08	7.57	1.67	9.07	2.13	8.25	1.43	8.45
Rater 7	6.62	2.06	5.40	2.06	7.74	2.28	6.33	1.86	6.50
Rater 8	7.06	1.03	6.63	1.03	8.16	1.19	7.4	1.28	7.30
Rater 9	7.19	1.10	6.69	1.12	8.50	1.43	6.73	0.88	7.20
Rater 10	8.00	1.38	8.0	1.38	7.71	2.65	8.69	1.23	8.00

Table 2: Average Raw Scores for each Question for all Raters.

The first phase of the present study analysed the mean marks and the standard deviation of the ten raters for the four items that they marked. The data presented in Table 2 reveals some interesting differences between raters that the tutor in charge of this course may want to consider.

An examination of Table 2 suggests that Rater 1 is a particularly hard marker with an average score of only 6.25

out of ten. Whereas Rater 2, the tutor-in-charge, seems to be about the middle of the range, as would be expected from the standard setting judge and the most experienced rater.

On the other hand, Rater 10 appears to one of the most lenient raters, which would normally not be unexpected given that this is the first time she had ever taught. This table shows that Rater 6 is the most lenient rater. Whereas, Raters 3 and 4 are providing ratings that are broadly consistent with the standard setting judge, which would be interpreted as being reliable raters. However, does this table draw the correct conclusions about the performance of these raters? The answer to this question is the focus of the next section.

Phase two of the study

The second phase of the study was a re-examination of the students' marks using the Partial Credit Model. It was noted above that the crossover between raters and items was maximised as all raters marked all items. However, there was no crossover between raters and students. Raters only marked the work of their students. In this phase of the study it was decided not to do anything to correct for this lack of crossover. Rather, it was decided to analyse the test results with no crossover between raters and students and compare them with the results obtained when the rater, item and student interactions are completely separated.

The information presented in Table 2 was re-analysed using the Partial Credit Model and is presented in Tables 3 and 4. The estimate for rater severity or leniency is presented in the first column of Table 3, while the estimates for item difficulty are provided in the first column of Table 4. The information presented in Tables 3 and 4 reflect the results of the triple marking process. Hence, there is maximum crossover between raters and items, but the influence of student ability on the measured severity of raters and the difficulty of the items is not included in these tables. The results from the Partial Credit Model are not very dissimilar to those presented in Table 2. This is not surprising, given the analysis that produced the information in Table 3 does not include the effects of the interaction of student ability on rater severity or item difficulty. The estimates for rater performance, item difficulty and student performance in all the following tables is derived from logistic regression analysis. The parameters are all measured in units called *Logits*. In a *Logit* scale, using the context of this study, "0" indicates average. Values above the average indicates markers tending to be harsh or that items are too difficult (more challenging). Whereas values below the average indicates lenient markers or easy items (less challenging).

			UNWEIGHTED FIT			WEIGHTED FIT		
Rater	ESTIMATE	ERROR	MNSQ	CI	T	MNSQ	CI	T
1	0.850	0.111	1.10	(0.26, 1.74)	0.4	1.07	(0.23, 1.77)	0.1
2	-0.664	0.107	0.75	(0.35, 1.65)	-0.7	0.88	(0.28, 1.72)	-0.4
3	-0.092	0.107	0.93	(0.33, 1.67)	-0.1	0.92	(0.29, 1.71)	-0.1
4	0.628	0.108	1.44	(0.33, 1.67)	1.2	1.43	(0.29, 1.71)	1.0
5	-0.976	0.108	0.90	(0.33, 1.67)	-0.2	0.92	(0.29, 1.71)	-0.2
6	0.518	0.103	1.02	(0.35, 1.65)	0.2	1.05	(0.31, 1.69)	0.1
7	0.022	0.105	0.81	(0.41, 1.59)	-0.6	0.76	(0.33, 1.67)	-0.7
8	0.207	0.103	1.04	(0.38, 1.62)	0.2	1.02	(0.34, 1.66)	-0.0
9	0.460	0.322	0.78	(0.35, 1.65)	-0.6	0.78	(0.31, 1.69)	-0.6
10	-0.954	0.112	1.08	(0.28, 1.72)	0.3	1.16	(0.21, 1.79)	0.3

Table 3: Rater Estimates Obtained from the Partial Credit Model

Rater 2, the standard-setting-judge has an estimate of severity of -0.664, an estimate of zero would be ideal. So, Rater 2 might be considered as somewhat lenient. Nevertheless, he fits the model quite well, as shown by his weighted and unweighted fit statistics. Both of his MNSQ estimates fall with the critical values and both t statistics are close to zero. Rater 10, with a leniency estimate of -0.954 is one of the most lenient raters, as might be expected. Rater 1 is still the most severe rater. On the other hand, Table 4 shows a substantial variation in item difficulty, over two *Logits*, which may have an effect on student performance in a situation where students are essentially free to choose which questions they answer. Nevertheless, all the items fit the model quite well.

			UNWEIGHTED FIT			WEIGHTED FIT		
Item	ESTIMATE	ERROR	MNSQ	CI	T	MNSQ	CI	T
WK7	-0.907	0.071	1.24	(0.73, 1.27)	1.7	1.31	(0.72, 1.28)	2.0
WK8	1.215	0.064	0.88	(0.78, 1.22)	-1.1	0.84	(0.78, 1.22)	-1.4
WK9	-0.784	0.066	1.11	(0.77, 1.23)	1.0	1.18	(0.77, 1.23)	1.4
WK11	0.475	0.117	0.83	(0.78, 1.22)	-1.5	0.81	(0.78, 1.22)	-1.8

Table 4: Item Estimates Obtained from the Partial Credit Model

As alluded to above, an important point needs to be made about Table 3. It provides estimates of rater severity taking into account only the inter-relationship between the rater and the items. Hence, it ignores the effect of student ability on the obtained ratings. Hence, Rater 1 may well be the hardest rater, but he may just have appeared to be the hardest rater in Tables 2 and 3 as his students decided to choose the most difficult questions. Or this rater had a higher proportion of lower ability students. In the context of this study, those students who find the linguistic challenges of economics more difficult than other students, might be over-represented in his tutorial groups. The inference that differences in rater performance might be conditional on the items answered or the composition of tutorial groups means that there is a need to fully separate the item, rater and student interactions. This led to the third phase of the study.

Stage three of the study

In this phase of the study, the item, rater and student interactions are completely isolated by maximising the crossover between raters and students. The crossover between raters and items was already maximised in both phases one and two of the study. The usual practice to obtain crossover in studies such as this is achieved by double marking around 20 per cent of papers. This is possible as the Partial Credit Model can still develop estimates of the parameters with missing data. This study was overly conservative. Hence, around 40 per cent of the papers were blind triple marked. Many of the estimates of the statistics obtained from the model are sensitive to sample size. So, the decision to triple mark 40 per cent of the papers meant that there was an eight fold increase in the number of "double marked" papers, which should commensurately increase the accuracy of the estimates of the statistics.

The focus of this section of the study is the information presented in Table 5. This information is derived from the triple marking. The triple marking allows for the interactions between item difficulty, rater severity and student ability to be separated. Table 5 is a map of student ability, rater

severity and item difficulty. These are the three parameters of the Partial Credit Model and are mapped onto the same scale using *Logits* as the unit of measurement. This Table separates the student, rater and item interactions and hence provides more accurate insights into rater severity and item difficulty. Moreover, the final column provides information about the interaction between the raters and the individual items. Hence, this column provides information about inter-rater variability, or consistency. Table 5 also shows a number of interesting points.

First, the tutor-in-charge (Rater 2) emerges as the hardest rater, with a severity estimate of about 1 *Logit*, which is in stark contrast to the estimate provided in Table 3 (-0.664). However, the average ability of the students in this course was about 4.25 *Logits*. So, even though he is the most severe rater, his ratings are comparatively easy compared to student ability.

Second, Rater 10, who had never taught before, now emerges as one of the more severe raters, marking about as severe as the standard setting judge. Hence, she is not the most lenient rater as suggested by Tables 2 and 3. Her apparent leniency could be explained in terms of the interaction of the ability of the students in her classes (higher) and the questions they chose to answer (easier).

Third, Rater 6 was shown as a lenient marker in Table 2 and a severe maker in Table 3. However, Table 5, taking into account all the student, rater and items interactions, shows that Rater 6 is indeed one of the more lenient raters. Whereas, Rater 1, who has consistently been shown to be the most severe rater now emerges as one of the more lenient raters. This might be explained in terms of the ability of the students in his classes and the items they answered. So, on balance it seems that these students tended to be lower ability, that is, they may have found the linguistic challenges of economics more challenging or they did not have well-developed study skills or they left their hand-up assignments until the last minute and so 'chose' to answer the more difficult items.

Finally, the estimates for item difficulty do not change much between Tables 4 and 5 as a result of fully taking into account the student, rater item interactions. The rater by item estimates show the extent of inter-rater variability, or consistency. The range of item difficulty shown in Table 4 is about 2.1 *Logits*, whereas the range of item difficulty shown in Table 5 is about 2.25 *Logits*. So, the full separation of students, raters and items does not affect the estimates for item difficulty too much. But what is more interesting is the range of item difficulty shown in the rater by item column. This column shows that the range in item difficulty is now about 4.25 *Logits*, which is double the range of item difficulty shown in the item column. This means that raters are marking items as if they are harder or easier than they really are.

For example, Rater 7 marked item 1 (point 7.1) as the most difficult item, when in fact it is the easiest item. Moreover, he marked it as if it was substantially harder than the actually hardest question, which is item 2. On the other hand, look at point 2.2. This shows that Rater 2 marked item 2, which is the most difficult item, as if it were considerably easier than the easiest item. Yet his other ratings were broadly consistent with the item difficulty. This lack of consistency is probably best explained in terms of the marking guides that were used by the raters. It would appear that they need to be re-designed to provide raters with more information about difference in item difficulty.

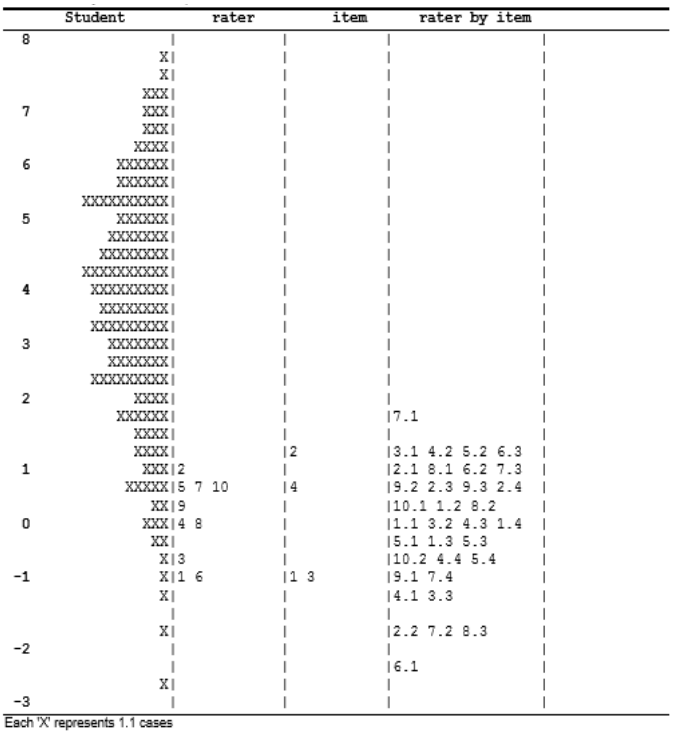

Table 5: Map of Student, Rater and Item Interactions

Table 3 can also be used to establish the presence of the halo effect. As shown in Table 1, the halo effect is present if the weighted fit MNSQ is less than one. Table 3 shows that four raters exhibit the halo effect to some extent, these are Raters 2, 3, 5, 7 and 9. Interestingly, Rater 10, the least experienced rater, has the second highest Weighted Fit MNSQ and hence does not exhibit the halo effect. Such a high incidence of the halo effect can probably be explained in terms of the marking guides. These results suggest that the marking guides at least need to be redesigned if not replaced by marking rubrics.

Table 1 shows that the central tendency effect is present if the unweighted fit MNSQ is greater than one and if the unweighted t is very much greater than zero. Table 6 indicates that about one third of the ratings were affected by the central tendency effect. Raters 1, 2, 9 and 10 were free from this error. It is not surprising that Raters 1 and 2 were free from this error, given their experience. It was a surprise to see that Rater 10 was also free from this error. On the other hand, Rater 4 exhibited the central tendency effect for three items, that is, questions 1, 2 and 3. Again the prevalence of this error may be reduced by the development of marking rubrics.

Table 2 suggests that raters whose weighted fit statistics fall outside of the critical interval demonstrate the restriction of range effect. Table 6 shows that the restriction of range effect occurs in 24 of the 40 rater by item statistics shown in Table 6. Again this finding suggests that the marking guides need further development.

Table 6 can be used to develop the above discussion about

rater	item	ESTIMATE	ERROR	UNWEIGHTED FIT MNSQ	UNWEIGHTED FIT T	WEIGHTED FIT MNSQ	WEIGHTED FIT T
1	WK7	0.988	0.162	0.70	-0.5	0.71	-0.6
2	WK7	1.116	0.151	0.68	-0.9	0.67	-1.0
3	WK7	-1.132	0.159	0.91	-0.1	0.69	-0.7
4	WK7	-0.292	0.157	1.39	0.9	1.41	0.9
5	WK7	-2.380	0.164	0.51	-1.1	0.58	-0.9
6	WK7	1.809	0.145	1.14	0.5	1.15	0.4
7	WK7	0.779	0.155	2.19	2.2	2.28	2.3
8	WK7	-0.965	0.155	3.63	3.6	3.84	3.8
9	WK7	0.145	0.471	0.50	-1.1	0.49	-1.2
10	WK7	-0.067	0.163	0.86	-0.1	0.85	-0.3
1	WK8	-1.717	0.147	0.84	-0.3	0.84	-0.3
2	WK8	-0.100	0.142	0.48	-1.7	0.47	-1.8
3	WK8	1.291	0.139	1.06	0.3	1.03	0.1
4	WK8	1.166	0.142	1.64	1.6	1.31	0.9
5	WK8	0.788	0.141	0.62	-1.1	0.64	-1.1
6	WK8	-1.797	0.142	1.10	0.4	1.09	0.3
7	WK8	0.297	0.135	0.99	0.1	0.99	0.0
8	WK8	0.342	0.134	1.00	0.1	1.02	0.1
9	WK8	-0.580	0.422	0.45	-1.7	0.44	-1.8
10	WK8	0.310	0.146	0.49	-1.5	0.50	-1.5
1	WK9	0.473	0.144	1.13	0.4	1.08	0.3
2	WK9	-1.186	0.148	0.49	-1.8	0.60	-1.1
3	WK9	0.376	0.144	1.01	0.1	1.04	0.2
4	WK9	-0.260	0.142	1.13	0.5	1.22	0.7
5	WK9	1.291	0.140	0.75	-0.7	0.71	-0.9
6	WK9	0.960	0.135	0.75	-0.6	0.77	-0.8
7	WK9	-1.916	0.149	0.53	-1.1	0.54	-1.2
8	WK9	0.473	0.139	4.27	5.2	4.19	5.2
9	WK9	0.007	0.430	0.34	-2.5	0.34	-2.5
10	WK9	-0.218	0.148	0.75	-0.6	0.86	-0.3
1	WK11	0.256	0.262	1.38	1.0	1.37	1.0
2	WK11	0.171	0.255	0.39	-2.0	0.40	-2.1
3	WK11	-0.535	0.255	1.11	0.4	1.11	0.4
4	WK11	-0.614	0.255	0.83	-0.4	0.73	-0.9
5	WK11	0.301	0.257	0.56	-1.3	0.54	-1.4
6	WK11	-0.972	0.243	0.48	-1.8	0.47	-1.9
7	WK11	0.840	0.254	1.73	1.7	1.67	1.5
8	WK11	0.150	0.248	0.77	-0.6	0.75	-0.7
9	WK11	0.429	0.765	0.58	-1.4	0.57	-1.5
10	WK11	-0.025	0.264	0.69	-0.8	0.69	-0.8

Table 6: Rater by Item estimates

inter-rater reliability of raters. As discussed in Table 1, the reliability error is present if the weighted fit MNSQ is greater than one and if the Weighted fit *t* is greater than zero. This error is evident in the performance of Raters 4, 6 and 10. However, this finding does not support the evidence that is provided in Table 5, which suggests that Rater 10 is quite reliable. The discrepancy between the results presented in Tables 5 and 6 can be explained by the fact that Table 5 shows the full student, by rater by item interactions. Again, rater reliability might be improved by developing the marking rubrics.

Concluding Remarks

This paper shows that evaluating rater performance is a much more difficult process than most academic managers expect. Proper rater evaluation needs to be more sophisticated than a cursory examination of measures of central tendency. Moreover, it is surprisingly easy to make an incorrect evaluation of rater performance as most managers would not be able to separate the complex interactions between student ability, the difficulty of questions and rater performance. This paper used the Partial Credit Model to evaluate one particular aspect of rater performance, the presence, or otherwise, of five common rater errors among a team of ten tutors. The team that was investigated here was a rather diverse group of people with varying levels of experience teaching First Year university Economics courses, ranging from just a few weeks to 30 years.

It comes as no surprise to the authors that the five common rater errors were present in the ratings of all ten raters. However, it appears that the more experienced raters were less prone to making these errors. But make these errors they did. The surprising finding of this study is that the least experienced rater, the rater for whom this was her first ever teaching job, was relatively free from making these errors. The new tutor was an exceptional young woman. She was a German international student doing Honours with the University at the time the study was conducted. It was planned to work out why she was such an effective marker, which might inform the tutor training process. Unfortunately, by the time the results of the project had become available she had been offered a PhD scholarship at another interstate university and lost contact. Further exploration of the explanation of the study's key findings would entail a derivative study.

Previous work by the authors suggested that the presence, or otherwise of these five errors was related to the nature of the employment relationships of the rater and the concept of ownership. That is, raters who were tenured or were employed on a long-term contract tend to have more ownership of courses and hence were less prone to making these particular five errors. In this study all ten raters were employed on a casual/sessional basis. So, the concept of ownership may not be appropriate. Nevertheless, this study would suggest that large classes should be taught by as few tutors as possible, teaching as many classes as practicable. However, this is not always possible. Although these raters were provided with comprehensive marking guides, they were not provided with marking rubrics. Even the most comprehensive marking guide still provides raters with some discretion or latitude, which in turn may create the space for rater errors to emerge. It would therefore be interesting to replicate this project to investigate whether the use of marking rubrics reduced the frequency and extent of these five rating errors.

The key finding of the study is that there appears to be a rating gradient. People who have been teaching and marking longer tend to make fewer rating errors than people with less experience. However, given the dynamics of the tutor / marker workforce, which turns over very quickly, most tutors do not get the experience to be relatively error-free. So, the challenge is to help people who are going to be tutors for a few years while they do their PhDs reduce their propensity to make errors. The key to this seems to be the development of better / clearer marking criteria or rubrics to support inexperienced tutors. Another suggestion would be to provide tutors with some form of professional development (a more in-depth training) in marking assessment tasks.

As a final word, we would like to re-visit Figure 1. The underlying premise of the Partial Credit Model is that student performance on essay style examinations is the outcome of the interaction between students, items and raters. The output of the Partial Credit Model includes the Item Characteristic Curve and the Person Characteristic Curve. These curves allow the performance of items and students to be compared to the model in order to identify misfitting items and students. However, at present there is no simple way to identify misfitting raters. So, this paper concludes with a call to the authors of the software to develop a Rater Characteristic curve in order to identify misfitting raters.

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Modernised learning delivery strategies: The Canada School of Public Service technology integration project.

Stephen Downes

Senior Research Officer, National Research Council Canada

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Abstract

The Canada School of Public Service (CSPS) leadership expressed a desire to modernise online programme development and delivery in order to more effectively meet the School's mandate. We conducted a review of modernised online programme development and delivery strategies, evaluated the School's current progress against those strategies, and recommended an integrated set of proposed activities that would augment online presence for learners, identify and deliver key learning and performance support needs, increase the effectiveness of online CSPS programs and services, integrate online CSPS services with those from other departments, and implement continuous review and improvement for CSPS online services.

Introduction

The primary responsibility of the Canada School of Public Service (CSPS) is to provide a broad range of learning opportunities and establish a culture of learning within the public service as set out in the Canada School of Public Service Act (Government of Canada, 2017).

The School's mandate is to:

- encourage pride and excellence in the public service;
- foster a common sense of the purposes, values and traditions of the public service;
- support the growth and development of public servants;
- help ensure that public servants have the knowledge, skills and competencies they need to do their jobs effectively;
- assist deputy heads in meeting the learning needs of their organisation; and
- pursue excellence in public management.

The mandate as described in the Act therefore speaks to the role of the School not merely as a provider of learning and learning resources, but also to its role in developing a learning culture in the public service.

In the last decade, and with the support of new technologies, corporate learning and performance support has been evolving from a model based on in-person and online classes to a broad-based strategy based on mobile support, personalisation and crowd-sourcing, and integration with online resources and communities.

The transformation at Accenture Connected Learning, provided to more than 370,000 employees worldwide, is a good example of this. According to Rahul Varma, Chief Learning Officer at Accenture: "Our field experts, our leaders, are actually curators. Within 18 months we've gone to over 1,000 learning boards that are accessed by more than 130,000 users, making it the fastest scalable learning vehicle we've ever known of" (Accenture, 2016).

The Government of Canada (GoC) is developing similar capacities. Launched in 2009, GCconnex provides social networking and online communities to the federal public service. It was complemented with the launch in 2017 of GCcollab, which extends similar services to provincial government employees and higher education institutions. The GoC also launched an online wiki encyclopedia, GCpedia, and GCdirectory, under the heading of GCTools. Concurrently, CSPS developed GCcampus to support social and collaborative online learning in the Canadian public service, expanding programme support beyond online courses in the institutional Learning Management System (LMS) to include online videos, case studies, job aids and videos. CSPS has also started offering learning events and distributes a quarterly newsletter.

The Government of Canada, and in particular the Canada School of Public Service, have been exploring the use of new technologies in order to support greater innovation and problem solving. It has identified social network technologies and crowdsourcing as a way to meet demographic and recruitment challenges (Robinson, 2014). These were targeted to help the public service compete with the private sector for the best talent and to engage employees "in order to empower them to contribute to their potential, to maintain their interest in working for the government, and to reach the government's goals" (Robinson, 2014).

Based on its own analysis of user requests, learning trends and client demand, CSPS identified five areas for programme expansion for GCcampus and the School. They were on a scale that required them to be treated as projects rather than areas for incremental improvement within the existing programmes. Those five areas were Mobile, Personalisation, Integration with GCTools, Crowdsourcing and Virtual library.

The National Research Council of Canada (NRC) was invited to provide expertise and assistance in scoping out these five areas. It performed an analysis of the School's existing service delivery and compared it to the state of the art in five major areas: mobile device support, personalisation, crowd-sourcing, virtual library and integration with other government services.

The NRC was selected because of its background and experience in the development of learning theory and applications supported by new media in education. In particular, the lead author is a leading proponent of connectivism, a learning theory that describes how social media and learning networks can support online personal professional development (Siemens, 2005). Connectivism inspired the development of the massive open online course (MOOC), which in turn employed the technologies being contemplated by the School of Public Service in this project.

This work was done in early 2017. Since then the School reports that there have been many advancements in what CSPS has accomplished and is working towards. They now have much better data that shows increased access to GCcampus as well as increase in access of online courses. Satisfaction with online courses is now almost equal with classroom deliveries.

Literature Review: Research and Cases

Our literature review revealed widespread uptake and use of the five core technologies in society generally and in education in particular. We focused on the definition and educational uses of mobile learning, personalised learning, crowdsourcing, virtual libraries, and integrated systems. These were not intended to be all-encompassing, but rather to indicate major trends within instructional technology. The outcome of this work was the set of research questions guiding our interactions with CSPS staff.

Mobile learning: this is most commonly defined with reference to the devices employed (Ally, 2008; JISC, 2011). For example, ISO describes it as "the use of mobile devices to support learning" (International Organization for Standardization (ISO), 2011). The adoption of mobile learning varies according to a number of factors. Empirical studies of technology acceptance show that major factors include ease of use, perceptions of usefulness, and attitudes toward mobile learning generally. These in turn are based on self-efficacy, relevance of the learning, system accessibility and social norms (Park, Nam, & Cha, 2012).

Personalised learning is described by the U.S. Department of Education National Education Technology Plan Update thus:

> Personalised learning refers to instruction in which the pace of learning and the instructional approach are optimised for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) may all vary based on learner needs. In addition, learning activities are meaningful and relevant to learners, driven by their interests, and often self-initiated (Office of Educational Technology, 2015).

Personalised learning is often based on a competency framework, which is a set of hypotheses about a person's performance, and mechanisms for testing and verifying them (Hirata & Laughton, 2012).

In the United States, these concepts are being expressed through an initiative called the 'Total Learning Architecture' by the U.S. Military's Advanced Distributed Learning program. Total Learning Architecture is "an evolving set of standardised Web service specifications to responsibly share essential learning data between applications using common API specifications and data models" (Advanced Distributed Learning, 2018). Analogous to the way health care providers need to be able to share personal healthcare data, "it is important to enable the responsible sharing of learning data between providers of education and training to improve learning outcomes" (Advanced Distributed Learning, 2018).

Competencies are described by ISO/IEC JTC1 SC 36 in terms of nine information object classes, including action, role, outcome, assessment process, method and criteria, and environment (International Organization for Standardization (ISO), 2014). As a part of its Total Learning Architecture, Advanced Distributed Learning is in the process of defining a Competencies and Skills Systems (CASS) programme (Advanced Distributed Learning (ADL), 2016). The purpose of CASS is to support competency portability, to support common reporting specifications, and to support resource alignment. By 'competency portability' we mean the ability to identify the skills or competencies being taught in a course, identify the same skills being taught in another course, and identify how this skill is applied in a profession or workplace (Robson, 2008). Javier Couto surveys the strengths and weaknesses of various chatbot platforms. "The chatbot ecosystem is moving very fast and new features are being released every day by the numerous existing platforms" (Couto, 2017).

Crowdsourcing: in education, crowdsourcing is the idea that learning "can be facilitated by connecting and empowering distributed communities of learners" (Maggio, Saltarelli & Stranack, 2016). It is based on the use of social networks in learning and especially content production (E-Learning 2.0, 2005). The attempt to crowdsource learning production and support gave rise to the first Massive Open Online Courses (MOOCs) in 2008. The synchronicity of networks, including social networks, is widely observed. The mechanisms of connectivity are described in graph theory (Bondy & Murty, 1976) and social network theory (Watts, 2003). Computationally, the effects can be observed in neural network software, a branch of theory called "connectionism" (Rumelhart & McClelland, 1986). Educational approaches based on this theory are classified under the heading of "connectivism" (Siemens, 2005).

Virtual libraries: these were found to be widely used in learning, and form the basis for work in the areas of learning resource metadata, access, copyright and licensing control. A virtual library is a collection of resources available on one or more computer systems, where a single interface or entry point to the collections is provided. A virtual library also provides user assistance services such as reference, interlibrary loan, technical assistance, etc. Terms such as Electronic Library and Digital Library are often used synonymously (Tella, 2016).

Integrated platforms: from the user perspective, it is a set of interface features. From a design perspective, it means managing (eg., Salesforce, 2012): web services, messaging, application programming interfaces (APIs) and associated toolkits, representational state transfer (REST) technologies, data aggregation and syndication using Rich Site Summary (RSS) or JavaScript Object Notation (JSON). These are machine-readable data formats that allow internet applications to work together and deliver more comprehensive services. It also means managing authentication and identity federation technologies that allow a person to use a single login to access multiple applications. The Canadian government's Blueprint 2020 (Clerk of the Privy Council, 2017) envisions a single integrated network of government services and including an open and networked environment.

Corporations are moving beyond courses and are supporting a full range of services. These new pedagogies are at the core of Visa's Corporate University, for example. Michael Ross, Visa's EVP of global HR, says: "Our goal is to foster a learning culture at Visa, where ideas… [include] everything from instructor-led training, virtual instructor-led training, performance support tools, e-Learning, simulations, gaming and interactive leaderboards" (cited in Kalra, 2016).

Companies and organisations are revising the traditional development cycle and model in order to respond to rapidly changing circumstances. The United States Department of Defense (DoD), for example, has created a comprehensive view of its 7 million personnel in order to deploy task-specific teams around the world on very short notice (Deloitte, 2017). This requires a system-wide understanding of the roles, functions and competencies of all staff, and a reorganisation of work.

Needs generation and performance assessment are at the core of modern workplace learning. Unilever, for example, in 2009 launched its Talent and Organisation Readiness Assessment Programme, concluding "skills need updating ever more rapidly so our learning strategy must deliver professional education that is mobile, engaging, easy to consume and on-demand" (Unilever, 2017). The company launched the Learning Hub in 2015. "The Hub uses digital technology and collaborative tools to meet the demands of modern, multilingual working" (Unilever, 2017).

Companies understand that the learning function needs to be supported with employee contributions and feedback, which in turn contributes directly to organisational performance. In 2016, for example, Ford incorporated employee polls, focus groups, and feedback strategies as part of its engagement program. It learned about areas where employees felt processes were overly administrative, and are "not working to create simpler, integrated customer-focused processes and tools" (Deloitte, 2017, p. 58).

Methodology

Research with the CSPS was conducted over three phases: first, a scan of literature relevant to the project scope; second, a review of the current state of the School with respect to trends discovered in the first phase; and third, development of recommendations for future work.

In the first phase project staff met with CSPS officials and determined the five areas of interest (mobile, personalised learning, crowdsourcing, virtual library, and integration). This was based on previous research by CSPS which was shared with project staff. These meetings determined the scope of these areas and the problems in these areas that were intended to address. The literature review combined formal and informal search. Using the five subject areas as search terms provided a list of relevant titles in each subject area. Additionally, informal research of 'grey literature' (Haddaway, Collins, Coughlin, & Kirk, 2015) was conducted. These included the use of Google Scholar and Google Search, as well as a review of Corporate Research reports available to the National Research Council Client Liaison Officer. Project staff also drew on existing expertise in the subject area. This research was conducted as a part of the Learning and Performance Support System programme (Learning and Performance Support Systems, 2013) and prior expertise created in the areas of open online courses and informal learning (Kop, 2012; National Research Council Canada, 2017).

The second phase focused on the current state of CSPS with respect to these five areas. It began with a review of internal documents provided by CSPS, including Usability studies, the GCCampus Business Plan, and CSPS Annual Reports. Project staff conducted 12 interviews averaging one hour each with 16 people. Most interviews were one-on-one, with two interviews grouping three people each. The sampling was purposive; participants were selected by School of Public Service management as responsible for various areas of CSPS administration: needs assessment, instructional design, data management, application and server support, course evaluation, operations, human resources, instructional technology and business intelligence, and subject matter experts capturing a wide representation of functions within the School.

Project staff also conducted an assessment of the CSPS website, including a review of videos and learning aids, enrolment and completion of several courses, and participation in an online event. The results of this investigation were compiled and presented in a second session with CSPS to confirm the completeness and reliability of the findings.

The third phase developed recommendations for the School to consider. Each of the five areas was mapped to the School's mandate and business objectives, resulting in a logic model describing the relation between the strategy and the goal (see Appendix 1). The logic model was contained in an editable format similar to Google Docs, with access granted to project and CSPS staff. The document underwent three formal revisions. As previously, the final result was presented and discussed with CSPS staff.

Government of Canada regulations on research ethics were followed throughout. The project plan was submitted to and approved by the NRC Research Ethics Board. Before interviews were conducted, participants read and signed consent forms. Individual interviews were recorded and transcribed; these transcriptions were combined into a set of anonymised documents, while original recordings and transcriptions were destroyed.

The content of this article corresponds with the three phases of the project. The sections on 'Research and Cases' and on methodology reflect the result of the first phase of the research. The sections titled 'Current State' and 'Perspective and Progress Toward New Technologies' correspond to the second phase that describes the result of the investigation of the current capacities of CSPS. Finally, the 'Discussion' section summarises the recommendations made in the final project report.

Study Results: Current State

The CSPS has focused traditionally on in-class learning. It is something the School understands and has developed expertise in. In recent years, online learning has increased dramatically and classroom-based learning has declined; recent numbers show that the School has gone from 90% classroom and 10% online to 90% online and 10% class-room courses. In addition to developing online learning, the School has been trying to modernise the classroom.

The School's business model was recently fundamentally changed. Originally, the School offered learning to other departments on a cost-recovery basis. Today, learning is offered to departments as a centralised service. This changes the way the School designs and offers courses. Whereas in the past it would develop custom learning for individual departments, today it is more focused on common learning offered to multiple departments. Fair and equitable access to core and common learning is provided at

no cost to individual learners and in the case of the Aspiring Director Program where access is limited; organisations are responsible for allocating their seats via their own Talent Management Planning exercise.

GCcampus is the School's online presence. Drawing together some legacy systems and incorporating some new products, development began three years ago in order to help meet the School's new mandate. GCcampus itself can be accessed from the open internet without the need to be within a government intranet. A login is required using credentials provided by the School. On GCcampus (as of spring, 2017), there were 310 courses listed, 33 job aids, about 100 videos, two case studies and a couple dozen blog posts.

GCcampus consists of the following components:

- Saba learning management system (LMS) - the system is used to manage initial login and user accounts, registration, tracking and reporting on formal courses taken by public servants. It also hosts a number of School courses, for example, Security Awareness course. It is used by a large number of learning advisors who create formal learning products based on policy statements. The Saba system is a legacy system.

- Drupal 7 content management system (CMS) - this system provides indexing, filtered search, and some storage for learning resources provided by the School. The Drupal module has been customised with the installation of some modules, including custom modules. Drupal is an open source PHP application.

- Moodle LMS. Moodle is an open source LMS written in PHP. It is easier to operate than Saba for both teachers and students. Moodle is used to host a number of GCcampus courses and to support discussion groups in the Moodle forums.

- Kaltura online video platform (OVP). Another open source PHP application, Kaltura hosts the videos offered on the GCcampus platform.

- CSPS service bus. This is a custom-built service in GCcampus deploying a RedHat Fuse product with a JBoss server. The service bus manages the exchange of data from one GCcampus application to another, and enables (for example) single-sign on using the Shibboleth identity system.

GCcampus also offers access to School events via webcasting. Registration to the event is enabled with a single click within GCcampus. A company called CanWebCast has been broadcasting the events (CanWebCast has since merged with another company to become Collaborate.video).

The wider environment in which GCcampus operates consists essentially of two families of applications: GC Tools, including GCconnex, though there is no real connection with them yet; and Human Resource (HR) and Treasury Board tools and applications, which include services such as MyGCHR (Public Services and Procurement Canada, 2015). The richness of the data is on the HR side, but again there really is not a solid connection between them at this time.

Other tools employed by CSPS include an event scheduling system, survey functions (using Survey Monkey, which may be replaced with SimpleSurvey) and Cognos for reporting. MySchool News is a quarterly publication available by email subscription.

Questions were asked about the CSPS approach to assessment and quality control, and whether these processes would map to new technologies. Currently CSPS relies on course-completion surveys to judge course quality – several people mentioned Kirkpatrick's Level 1 assessment specifically (Kirkpatrick Partners, 2009). In some cases, 360-degree evaluations are conducted, whereby supervisors are also questioned, in order to determine the transfer of learning to performance (hence reaching Level 3).

On the question of quality control itself, responses were mixed, with some (apparent) satisfaction with the current process. The employment of Universal Design for Learning (UDL) and WETkit (which stands for 'Web Experience Toolkit', and is a design template all Government of Canada websites are required to use, in order to ensure ease of access and regulatory compliance (Government of Canada, 2012)) ensured quality, said some. However, others argued that training is more than just transmitting information and more than just compliance.

There was recognition that quality control needs to focus more on business goals and learner needs. And CSPS needs to consider in its assessment process what feedback it actually needs, and how to get that feedback.

Study Results: Perspective and Progress Toward New Technologies

Mobile Technologies

Canadian government employees, especially at management level, have traditionally been supplied with Blackberry devices. The purpose of this section was to assess the impact of this policy and changes in the mobile device environment on expectations of device support by CSPS.

Nobody suggested standardising on Blackberry, and there was wide recognition that CSPS would need to be able to support a range of devices. Additionally, it was noted that government is trending toward 'Bring Your Own Device' (BYOD) and that therefore, non-standard device environments could be expected.

It was understood by participants that supporting BYOD raised policy issues connected to support, security and service delivery, including those concerns raised by the Office of the Privacy Commissioner (Office of the Privacy Commissioner of Canada, 2015).

Staff approached mobile technologies from several angles.

- Access - mobile learning means having access on their device, in any browser, at any time. It means learning anywhere you want, or being able to learn on the fly, learning as you go, using different devices.

- Device - there was some disagreement on the idea of device. Some people thought 'mobile' meant a focus on smartphones only, with tablets and laptops being more like desktop learning than mobile. Others included these, on the ground that they are mobile, in contrast to the desktop.

- Location - learners can learn outside their office using mobile devices. Not all civil servants are office-based, however, and many work in the field.

- Design - this is the idea of content specifically designed for mobile. For example, mobile could be like the YouTube or Google of learning: you have questions and you can get immediate answers. The applications have to be re-engineered, which means asking what the business need is and who the audience is.

People generally agreed that almost everybody has a mobile device, including especially smartphones. A significant number of public service employees had department-issued Blackberries. Meanwhile most people had personal devices, usually Androids or iPhones.

The market for mobile would be different than that for traditional learning content, and would not include all of GCcampus content. Some people mentioned videos, podcasts and online events explicitly. The primary existing use of mobiles was for communication, especially by phone, but sometimes by text (it was noted people use text messaging more in their personal life than they do for work).

People also mentioned the use of mobiles in classrooms (especially when tablets and laptops are included).

Personalised Learning

There was a relatively consistent understanding of personal learning based on adaptability and ease of use:

- Content-awareness – when I log on the system knows who I am, it knows what I'm looking for, it knows what my job is and what department I work for, and it pushes content accordingly.

- Broker – the system knows that I learn from a wide variety of courses, and brokers my access to them, according to my position and needs.

- Adaptability – the system adapts to my learning (what I've learned, how I learn) and adapts technologies to suit me, presenting only what I need.

Examples of personalisation mentioned by respondents included Duolingo, which tests for linguistic competence in a language and delivers lessons to help one learn the language accordingly, and Netflix, which recognises viewing patterns and recommends accordingly.

Personalised learning and performance support are linked. The service should be more like Google than anything, where it knows what you need and will help get it for you. At the executive level there have been many promotions in the system and the School hears a desperate need for 'show me how':

- show me how to think strategically;

- show me how to reframe an issue;

- show me how to deal with the ambiguity of the world right now.

Related to this, several people expressed enthusiastic support for the online events being broadcast via webcasts (and which also could be distributed as podcasts). A specific block of time is allocated for them, which makes scheduling much less ad hoc, and they address current and timely issues, and support immediate feedback.

The discussion of personalised learning also raised discussion of competences, and the two concepts are closely linked. The Ministers and the public are keen for CSPS to look at personalised learning to support the transferability of learning when one enters or leaves the public sector. Their records should follow them, perhaps tied to Prior Learning Assessment / Recognition (PLA/PLR). But some of these records might be private or proprietary to the public service.

The Government of Canada employs a set of Key Leadership Competencies (KLC) (Treasury Board Secretariat, 2016) defined by the Treasury Branch. Leadership courses are built on the leadership competencies, but it is not a standardised approach. Respondents also referred to the "16 core competencies" as well as competencies for functional communities. For example, the IS group (IS1-IS6) has 20 or 30 competencies which are increased as you go along (in a grid).

There is perhaps a tension in different approaches to personalisation. GCconnex and GCcampus were developed using open source tools. By contrast, the government employs large enterprise systems such as Saba and PeopleSoft. The School could embrace the formal standards-based approach to learning inherent in these large systems. But personalised learning also supports the trends towards lifelong and informal learning.

Crowdsourcing

Crowdsourcing ties in well with mobile learning and supports the idea of social learning and collaborative learning. However, the question comes up immediately as to whether the information being uploaded by people can be trusted.

The idea of crowdsourcing can range from having a sharing space to encourage public servant contributions to orchestrated collaborative and social learning activities. Definitions included these and various shades in between:

- Course commentary – for example, a person could write that they took a course, about how they applied it when they returned to work and make a selfie video about the results.

- User-generated content – for example, gathering content from users to create courses or other learning resources.

- External content – sourcing learning content from other departments, for example, a recent security course created through consultation with 24 departments, or job aids created in another department and posted in GCcampus.

- Content curation – large groups of people get together and share (and rate) resources from a variety of sources.

- Collaborative learning and social learning, where people would get together to solve problems, create resources, or evaluate policy.

- Alternative pedagogies – enabled through crowdsourcing methods. In addition to helping the School develop flexible responses to emerging issues, crowdsourcing supports hands-on experience-based learning, and it helps in the formation of personal networks and communities.

The voices in favour of crowdsourcing were very strongly in favour. They identified it as a mechanism to help with needs analysis, to obtain feedback and evaluation, to source new resources and new information, and to keep the School up to date with current approaches to teaching and pedagogy. Others could not imagine the idea of people uploading their own content to GCcampus, particularly if that content were to be used for learning.

The use of shared learning spaces and crowdsourcing also creates obvious privacy and security implications, especially in an environment like the Government of Canada. There is a need for technology developers to focus on providing tools for the employers that can help in mitigating disclosure risks for sensitive business information.

Moreover, the Treasury Board Secretariat (TBS) has a variety of rules governing accessibility, bilingualism, common look and feel, information management, the protection of personal privacy, and more. These regulations apply to services managed and offered by CSPS.

Having said that, after a three-month pilot, a new service called GCcollab has been launched by the Treasury Branch in early 2017. This service is similar to GCconnex, with the difference that members of the college and university community in Canada may also be members. GCcollab could be used by the School to illustrate what it takes to perform various jobs in the public service. They also felt that there might be a marketing and communications role.

Virtual Library

The original intent of plans to develop a virtual library was to offer online access to texts and resources employed in CSPS courses analogous to the manner in which the physical library offered resources to participants in in-class courses. The model would be to implement a library services-agreement with service providers for e-books, with all the functionalities.

But we can imagine a wider possibility. With all the departmental libraries closing there is a greater opportunity to do something meaningful. Is the Government of Canada maintaining EBSCO and for-fee academic databases? Perhaps there is an opportunity for all of the public service to be covered under a single service. This would go well beyond the mandate of the CSPS, however.

There is a large number of virtual libraries in other government departments, including, for example, the Federal Science Library and the libraries hosted by the National Research Council and the activities of Library and Archives Canada (LAC). And again there is possible interoperability via GCcampus. Some suggested the School could scan for and add resource listings, without any additional work – "but there would have to be some kind of caveat or waiver that we are not all-encompassing," said one respondent.

Any library initiative essentially entails the employment of resource metadata standards. Work on resource metadata standards has been an ongoing activity for the School for some time now and over the years, there have been a few groups working on this. Some staff were aware of initiatives such as Learning Object Metadata and Cancore (Cancore, 2006).

Respondents also described initiatives to employ metadata for learning resources (MLR; International Organization for Standardization (ISO, 2011). There was an effort to develop a taxonomy, and efforts to make metadata creation more integrated with content creation tools, so when staff enter resources, they have to tag them to get to the next page in the input process. The GCcampus operations process plays a significant role with respect to metadata: in order to upload content onto GCcampus, certain metadata fields have to be completed, for example, 'target audience'.

A common library function – virtual or otherwise – is content curation and materials assessment. The major quality control initiative is through the GCcampus onboarding process. For CSPS materials, translations / copyright / accessibility requirements are validated by the process and are based on Treasury Board of Canada Secretariat (TBS) standards. Staff generally felt that the School was very compliant with these regulations.

Integration with Other Platforms

The possibility of integration with GCTools creates business challenges for CSPS. First is the question of exactly what would be connected. Then there is the question of how deep the integration would go. Who would be responsible for

technology development? What would branding look like? How would user access be managed?

What does 'integration' mean? Several scenarios were discussed:

- Linkage – each system would be represented with a tab or an icon on the other system.
- Single sign-on – GCcampus already has single sign-on within its own suite of tools. The Treasury Board Secretariat (TBS) has expressed interest in single sign on with GCcampus and GCTools.
- Common Services – CSPS services would be listed among the other services in a single Government of Canada employees' dashboard or menu.
- Extending the bus – user information and data would be exchanged between CSPS applications and other applications, especially GC TOOLs.
- Learning Tools Interoperability – GCTools services (and perhaps other services) would be launched using the Sharable Content Object Reference Model (SCORM; Rustici Software, 2017) or Learning Tools Interoperability (LTI; IMG Global, 2016) mechanisms and specifications.
- Full integration – CSPS resources are available throughout GCTools and vice versa. Thus, for example, GCconnex discussion groups could be created and accessed from courses, while courses (especially those on how to use GCTools) could be accessed directly from GCTools.

Respondents also addressed the business value of integration. A few things stood out. There was near universal support for a single sign-on mechanism, with respondents citing it as the most frequently sought-after improvement by learners. Additionally, respondents looked at integration as an excellent means to enable CSPS to deliver on its core mandate of offering training and support to the federal public service.

As mentioned above, single-sign on was the single most discussed issue in the entire consultation. Two major themes emerged:

- Everybody wants single sign-on, defined as "you sign on once to your government account, and then you have access to everything," and
- Multiple single sign-on projects exist in the Government of Canada. For example, CSPS has its own Shibboleth-based identity system (Shibboleth Consortium, 2017). There is also the Online Registration and Credential Administration (ORCA) MyKey initiative (Shared Services Canada, 2017). There is in addition the general desktop login people use in their own departments (note that we did not attempt a full survey of sign-on mechanisms).

In addition, several issues were raised. First, the level of security provided by (or required by) different sign-on systems varies. Examples include password change requirements, location (in or outside the intranet) requirements, and hardware requirements. Additionally, security needs vary department by department. Second, there is not a clear definition of the need for, or business value of, sign-on requirements. Part of the reason for this is record-keeping, so people can be tracked and recognised for the learning they do.

Discussion

The result of the review found that although CSPS had made significant progress extending its platform beyond the LMS, it offered limited support in each of the five major areas. It found that development and delivery services remained focused on online-course provision, and that the School's structural and service orientation was slowly transitioning to new technologies and pedagogies.

There is uncertainty in the School regarding instructional design and pedagogy. The in-person courses offer contemporary experience-based and discussion-based pedagogies. But the online courses employ a traditional 'presentation-and-test' pedagogical model. There is recognition in the School that this model needs updating and work is underway to address these areas.

It was the view of the analysts that CSPS technological progress in these areas should be incremental, rather than a rapid expansion of any individual service. The following considerations warrant this conclusion:

- The School has not yet had time to implement the new functionality that has already been installed. Many features (for example, ratings) are available but have not been switched on. Other features (for example, blogs) have been lightly used and would benefit from wider participation. Other features (for example, support for access to ebooks via EBSCO subscription) are in pilot mode or about to be piloted.
- Changes in the wider learning technology infrastructure environment will impact GCcampus. In particular, if a new LMS is acquired, the service bus linking GCcampus tools (Drupal, Kaltura, Moodle) will need to be updated. Adoption of single-sign-on by Shared Services Canada will also require that the service bus be updated. And the continuing expansion of capabilities in GCTools may pre-empt the need for a concurrent expansion in GCcampus.
- The School needs to build on and document experience and success using GCcampus tools. Most work, and most activity, centres around the online courses. The need, however, is for ongoing performance support in the form of communities, resource bases, events, and crowdsourcing, as well as the building of specific competencies to support performance and talent management. Academic and support staff at the School need to develop experience and skills in performance support as well as course-based learning.

- No single one of the services (mobile, personalisation, crowdsourcing, library, integration) can be expanded without impacting the remaining four. For example, mobile learning is not suitable for online classes, but rather, for context-specific performance support through access to a social network and relevant resources. An expansion of mobile would require an expansion of the other four areas. To a significant degree, they move in tandem.

The School has developed a used technological environment in GCcampus that will support future expansion in a number of areas. The primary imperative at this juncture, however, is to leverage that investment to become proficient in the use of these new technologies.

The outcome of the analysis was twofold: first, the need to grow expertise in the use of new learning technologies; and second, the recommendation that the expansion of these technologies focus on incremental improvements across all five themes.

In order to realise this mandate, and given the analysis of the CSPS Technology Integration Project to date, the following strategy is proposed:

- define and align to a contemporary model of online learning support;
- develop solutions incrementally rather than a rapid expansion of any individual service.

The project team thus made the following recommendations:

First, while personalisation based on adaptive systems supporting individual competencies is desirable, the existing resource base does not support such a programme, and the future LMS environment (if any) must be defined. In the meantime, concrete steps can be taken to prepare staff and students for the future of personalised learning, beginning with the development and distribution of notification and resources tailored to functional community, location and role.

Second, because crowdsourcing depends on the ability and willingness to integrate learner and third party feedback and contributions, and these are at a nascent stage of development, it is necessary to develop the School's capacity and comfort level with crowdsourcing before any large-scale development can be considered. It is also necessary to devise and embrace mechanisms that encourage participation and contributions to crowdsourcing initiatives.

Third, the integration with other government services is highly desirable but poses complex challenges. The primary target for integration is GCTools, given the potential for the GCTools environment to support personalisation and crowdsourcing services. It would also be desirable to integrate with human resources, competency and performance management systems. The single most-requested feature was single-sign-on. Beyond that, support for personalised learning will depend on integration, but in turn requires coordination with external services, some of which are not yet fully developed and implemented. The focus of the proposed activities is therefore to support loosely integrated interoperability with external services.

Fourth, we noted that most mobile devices are not suited to the delivery of online courses. Nor is it practical to develop platform-specific applications (such as an iPhone app). Mobile support in this context should focus on responsive and cross-platform design (for example, HTML5-based design) and on performance support resources, and in particular, the GCcampus website. Additionally, it should be recognised that 'mobile learning' entails support for learner mobility, and not merely support for mobile devices. The use of mobile devices should be considered in support of other initiatives, for example, mobile calendar notifications for learning events.

Finally, fifth, while it is desirable to provide access to eBooks to support online courses, and this is the intent of the virtual library, at the same time, library services are being offered in various departments, with some centralised functions (such as the Federal Science Library) being developed. It is not desirable to duplicate this service; the purpose of a CSPS virtual library is to support performance support (consider rephrasing – repetition of support: "support performance support"). There is a need to provide access to more than just eBooks; learners require access to videos, podcasts, learning objects, and other performance support resources. These should be both produced by CSPS and sourced from other departments.

Conclusion

This work examined five areas targeted for programme expansion by the Canada School of School Public Service: Mobile, Personalisation, Integration with GCTools, Crowdsourcing and Virtual Library. An analysis of the School's existing service delivery was compared with the state of the art in each area. Based on this work, a logic model was developed defining a roadmap for future work. This work was done in early 2017. Since then the School reports that there have been many advancements in what CSPS has accomplished and is working towards. They now have much better data that shows increased access to GCcampus as well as increase in access of online courses. They also reported that satisfaction with online courses is now almost equal with classroom deliveries.

In the months since this research was conducted, the School of Public Service has begun to move forward on most of the recommendations. Though the outcome of this research was the roadmap discussed above, the research underlines the need for broad-based consultation before the development of new learning technologies in an existing learning organisation can be accomplished. The work shows that implementing any of the five key technologies would have an impact that reaches into all areas of the organisation, and so it is necessary to have a clear understanding of what those areas are required to accomplish and how the deployment of new learning technologies impacts that mission.

On a more comprehensive note, this research also shows the relevance of recent research in advanced learning technologies to government and corporate learning. There is a greater acceptance of, and indeed, greater need for, approaches to learning that move beyond the courses and classrooms paradigm instantiated in the learning management system. Indeed, the question of whether the School should be moving in this direction was rarely raised; the concerns centred on how new learning technologies could most effectively meet the changing needs of the school. This serves to validate, to some degree, this recent research.

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Optimising learning outcomes through social co-creation of new knowledge in real-life client challenges.

Arthur Shelley[A]

David Goodwin[B]

A *Senior Industry Fellow, RMIT University, Melbourne, Australia*

B *MBA Director, Graduate School of Business and Law, RMIT University, Australia*

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Abstract

People are naturally creative, subjective creatures who (when engaged well) love to learn. However, traditional education is about transferring known content rather than stimulating the co-creation of new knowledge and insights to generate future value in unknown situations. Too often, in this misaligned traditional approach, there is an overemphasis on quantitative assessment of 'remembered facts' and insufficient attention given to demonstrated capabilities to apply the learned insights to a range of possible future scenarios. The outcome of this can be graduates who are not ready for the VUCA (Volatile, Uncertain, Complex and Ambiguous) world. This conceptual article describes an experiential learning programme in which there is no teaching of content. Instead, learners experience a range of real project challenges in contexts where the clients genuinely want well-informed, relevant advice to implement recommended options. Learners collaboratively interact in an Applied Social Learning Ecosystem (ASLE) to build content that is relevant to the external clients' challenges and resources. Learners co-create a range of prioritised options for their client to adopt, adapt and apply and build a compelling argument to engage them to do so. The course was designed with a wide range of learning theories embedded and facilitated in a way where these have been applied in practice rather that taught as models. The course has received positive feedback from all parties – the learners, the clients, the business mentors and the school. The "Co-created Projects Worth DOING" generated by the learners in the process of their learning activities have generated significant social benefits for the clients. The experience has been consistently enjoyed by all, including the learning facilitators and mentors. It continues to evolve as feedback from the participants informs the next iterations.

Introduction

There are many pathways to learning (Biggs & Tang, 2011; Knowles, Holton & Swanson, 2011; Deardorff, de Wit, Heyl & Adams, 2012) and these are constantly evolving (Ferguson et al., 2017). This conceptual paper explores creating a hybrid social learning environment that combines characteristics and theoretical constructs of many of these pathways in practice to enhance the overall learning experiences and outcomes.

Socialisation in learning is not a new concept, it has been an important part of many learning approaches. Engaging people with each other to explore possibilities is a common technique to stimulate learning in many learning approaches including Reflective Practice (Schön, 1995; McIntosh, 2010), Action Learning (Routman, 2000; Zuber-Skerritt, 2002; Marquardt, 2004; Checkland & Poulter, 2006), Experiential Learning (Kolb 1984; Mainemellis, Boyatzis & Kolb, 2002) and Problem Based Learning (Gibbs, 1988; Winter, 2006; Vidal & Marle, 2008; Edmondson, 2011). Social interactions are also important in learning-related applied concepts such as Learning Organisation (Senge, 2006), Action Research (Dick, Stringer & Huxam 2009), Complexity Theory (MacGillivray 2006; 2008) and Design Thinking (Liedtka, King & Bennett, 2013). Socialisation is the first stage of Nonaka and Takeuchi's (1995) SECI model model for cycling of knowledge through different forms to sustain high performance (Socialisation, Externalisation, Combination, Internalisation) and a recognized feature of intercultural education (Carey, 2006; Johnson, 2006).

Socialisation to co-create new insights, as opposed to just sharing existing knowledge, is becoming more important in our modern world because of a number of interdependent factors, including acceleration of social and political change and rapid changes in technology (Bennet & Bennet, 2004; Thomas & Brown, 2011). Socialising concepts in real contexts has elevated education in countries like Finland and more recently South Korea to the top of the world's education ranking (NJMED, 2018; OECD, 2018).

This conceptual article shares insights drawn from ongoing pilot which explores how many elements of these learning theories can be harmoniously included into an Applied Social Learning Ecosystem (ASLE). Sixty elements were combined into the learning experience and applied to a real project. It is proposed that such hybrid learning approaches may generate better learning outcomes and better prepare learners for modern Volatile, Uncertain, Complex and Ambiguous world (VUCA) workplaces. In doing so, this article aims to challenge existing orthodoxies on the future of education. It also proposes that facilitating learning in an ASLE can help generate superior outcomes and provide social benefits.

Foundations of social learning

The Institute for Research on Learning (2014), co-founded in 1986 by John Seely Brown, documented seven principles of learning from extensive field research. A slightly shortened version of these are:

1. Learning is fundamentally social.
2. Knowledge is integrated in the life of communities.
3. Learning is an act of participation.
4. Knowing depends on engagement in practice.
5. Engagement is inseparable from empowerment.
6. Failure to learn is often the result of exclusion from participation. Learning requires access and the opportunity to contribute.
7. We are all natural lifelong learners.

The longer form of the principles includes the statement "While learning is about the process of acquiring knowledge, it actually encompasses a lot more. Successful learning is often socially constructed and can require slight changes in one's identity, which make the process both challenging and powerful."

Van Epp and Garside (2014, p. 7) developed the following definition of social learning:

> Social learning approaches help facilitate knowledge sharing, joint learning and co-creation experiences between particular stakeholders around a shared purpose, taking learning and behaviour change beyond the individual to networks and systems. Through a facilitated iterative process of working together, in interactive dialogue, exchange, learning, action and reflection and on-going partnership new shared ways of knowing emerge that lead to changes in practice.

They suggest social learning is an approach that provides a way to address complex problems by integrating a diversity of insights, perspectives and knowledge through iterative learning cycles. When facilitated well, stakeholders engage in constructively challenging a range of alternative views across multiple levels and through different lenses. Such interactions aim to unlock potential ideas, opportunities and highlight risks that can accelerate change by leveraging technical, institutional and social knowledge (Axelrod & Cohen, 1999). Social learning is highly inclusive and curious about exploring alternatives through iterative cycles of conversations that stimulate co-learning (Schön, 1995).

Humans are emotional and more easily influenced by perception than logic (Cozolino, 2006). Our current education systems are generally not aligned with this natural divergent thinking preference (Robinson & Aronica ,2016). Rigid approaches can stifle creativity and reduce learning engagement (Reeve & Jang, 2009). Autonomous approaches to learning enhance motivation and encourage critical thinking and interdependence (Reeve, 2009). If you watch children play you see they are naturally creative. However, they are soon taught that 'serious' learning involves removing the play and becoming focused on the (known) answer (Brown & Vaughan, 2009). Traditional formal education reinforces high performance and is focused on discovering (known) answers and rewarding students to reproduce existing knowledge as it is. This inward mindset highlights why some professionals struggle to perform in the changing workplace (Dweck, 2012). Their confidence that they will find the answer to modern complex challenges by focusing inward is a recipe for failure, and they become less adept at diverging outward to create a range of possibilities. Many

traditionally educated people have become somewhat lost, are challenged to apply their learning and are uncomfortable in uncertainty. They seek stable processes to ensure they are 'on the right track,' but can become more confident by finding their 'element' (Robinson & Aronica, 2010).

However, if you look at the modern uncertain world, it is unpredictable, complex and under constant change and this provokes a shift in how we view education (Brown, 2012). Thriving in this world requires agile creativity and confidence in emergent uncertainty and thinking at a higher level of awareness and consciousness (Bennet, Bennet, Shelley, Bullard & Lewis, 2017). High performing organisations across the world understand innovation that creates new products, services and approaches to drive change in the market are critical to sustained success (Newton, 2014; Australian Government, 2017; Forbes, 2018; Head, 2018). Many traditional organisations that have tried to resist change have become obsolete or struggle to survive. A preferable approach to trying to resist or control the environment is to creatively leverage change. In doing so, learners create alternative future options, rather than reacting to what others have forced upon them. This way they remain resilient.

Learners who think they know the *answer to the problem*, are probably limiting their own and their team's performance. The human brain is a self-organizing system which is very efficient at forming patterns around past experiences. It does this to automate decisions from what it already knows. Some may think this is a good thing – learning from the past to speed-up decision-making. This is useful for a world that is static, a world where past experiences would be a beneficial guide to the present and future. However, the world is an emergent complex place that is frenetic and ever changing and this is where our decisions based on past experiences can generate sub-optimal options for future opportunities.

A key challenge is that our early successes usually arise from solving problems in the way our education system taught us to. The systems' and the authorities' (teachers and employers) reward is from 'discovering the right answer'. That is, working from existing knowledge with *known* principles and following historically determined best practices. Kodak and Nokia are former leaders in their fields who were not able to retain that position partly due to their limited rate of innovation. A moment of reflection leads to the realisation that today's answers are insufficient for tomorrow's successes, as rapid changes in political and socio-economic relationships change customer and stakeholder expectations.

In the past, 'Knowledge is Power' was a driver of success. Intellectual property could be sold to followers at high profit, often for long periods. However, now leaders remain dominant only if they cocreate new knowledge faster than their competitors. Existing knowledge loses value quickly as new insights, products and services are quickly improved. 'What is best' is soon relegated to 'what has just been surpassed'. That is, 'the numbers' are dependent on how creative the implementer is able to be. Performance, relevance and reputation are dependent on very subjective aspects such as customer perceptions of worth, trustworthiness and the ability to remain ahead of the alternatives.

The business world is full of examples of organisations which gained market dominance because of their creative products and services, then fell from market leadership. This tends to happen because they 'stabilise' to milk the market, instead of continuing to be creative and drive innovation further (Mikhailovich, Dmitrievich, Evgenevna & Pavlovna, 2017). They changed their own reason for success (being creative) by falling into the false confidence that having reached the top, they could remain there by becoming risk averse and attempting to control the market (Ghanbari, Ghorbani & Pouya, 2015).

Nokia *should* have invented the smartphone but chose to keep doing what they were good at. Kodak *did* invent digital photography but decided to hold back because it would undermine their existing film-based business. Puttiing 'what is!' ahead of creatively considering 'what is possible?' in complex challenges creates risks for any organisation (Klakegg, Williams, Walker, Andersen & Morten, 2010).

Traditional teaching practices are focused on remembering '*what is*' and this creates a closed mindset. A mindset that believes success comes from convergent thinking leads to 'discovering the right answer'. This mindset draws confidence from certainty and comfort from knowing, reflecting less mature actions from the bottom of the Learning Hierarchy (Figure 2). Convergent thinking is good for management problem-solving but is exactly the opposite of what will make us successful leaders (Shelley, 2017).

Future leaders need to be comfortable in uncertainty and prepared to act with limited knowledge, to explore the unknown and co-create new knowledge. That is, we benefit from acting from an open, divergent mindset to stimulate inclusive connections between people and emerging insights to co-create new ideas. Co-creation drives sustained success through conversations and active interactions between people bouncing ideas in an environment of Creative Friction (Shelley, 2017).

This paper discusses two specific ASLE learning experiences that have been deliberately designed to connect as many of these factors as possible. It is proposed that this interdependent and socialised approach provides a deep and engaging learning experience that equips participants to be more effective as lifelong learners. They achieve this by ensuring learners have a prior conscious understanding of how collaborative socialisation provides them with an enhanced capability. This is achieved by setting all learning in the context of real project work and the opportunity to break this approach into micro-learning to enable a more flexible schedule for the learner is also discussed. These learning experiences are focused on developing 'Co-created Projects Worth *Doing*' rather than transfer of existing knowledge. That is, they leverage existing knowledge from the diversity of participants to inform stakeholders about decisions and actions they recommend. In doing so, they co-create new concepts and opportunities in the context of real clients' challenges.

Social learning experiences in real world projects generate optimal future performance

Two initiatives with creative approaches to learning currently being implemented are briefly described here, followed by a more detailed analysis of the first. The initiatives are:

Executive Consulting, a capstone course in the Executive MBA at RMIT University; and
Creative Melbourne, an independent deliberately diverse participant event.

Both have been running in parallel for three years and the insights for learning outcomes gathered from these experiences are shared and discussed. Both are co-creative in how the learners engage and generate projects that have social impact. They are continuously evolving from the feedback of participants and from other parties involved in some way (producers, learning facilitators, volunteer mentors and other interested observers).

The common features in the design of these learning experiences are:

- Experiential learning is based in context rather than content-focused.
- Participants (learners) co-create novel options for real world challenges.
- Collective knowledge of all participants is openly and inclusively engaged.
- "Creative Friction" (deliberate constructive disagreement) is an active component throughout.
- Participants are deliberately drawn from a wide variety of disciplines to maximise diversity.
- Full intent to deliver a range of new options that will be implemented by a project client.
- Focus in proposing a "Co-created Project Worth DOING" as a tangible output and premium learning experience as an intangible outcome.
- Balanced activities enabling harmonised completion of work tasks and learning.
- Strong element of gamification activities to emphasise interdependence of different fields of knowledge and draw upon the breadth of experiences of the participants.

Executive Consulting learning ecosystem

The Executive Consulting (EC) course, the capstone of the Executive MBA at RMIT University, was developed by drawing upon earlier courses which deployed similar principles (Shelley, 2014; 2015). It is completely experiential to ensure socialisation of ideas across all learners and to ensure application of the learning in the context of a real client project. Learners develop the knowledge, skills and behaviours needed by executive leaders to research and design strategic projects to meet clients' needs. Learners bring their own experiences into the course and reflect on the impacts these have in a range of contexts including progression of their career, identifying options to achieve their career goals. In doing so, they modify their lifelong learning approach and become lifestyle learners. That is, learning that fits into the rapid pace of how we now live. This highlight why micro-learning is becoming more important.

The course is facilitated as a weekend intensive combining learners who normally engage in face to face learning and those who normally study virtually. They come together to meet the real client to discuss their challenges and how they can assist. Learners self-select a client and form a consultancy team that initially focuses on divergent exploration of options to enable creative possibilities to emerge and then mature. After several weeks they revert to convergent thinking to prioritise the possibilities into a strategic set of options that are costed and assessed for return on investment within constraints articulated by the client. The team are provided with the services of an experienced business mentor to provoke their thinking and ensure they do not jump to known answers too quickly. In parallel to this project each individual learner is required to develop an up to date research article on an aspect of consultancy practice. Each learner has a different topic, which means they collectively collate an 'encyclopedia' of the latest thinking across around 30 relevant topics. All learners can see one another's work and are given extra marks for assisting fellow learners. They are also encouraged to link to each others' online pages to reinforce that collaboration is a more productive approach than hoarding ideas and knowledge for themselves. These experiences help to develop their skills across all three domains of capability; knowing, doing and being. This helps to develop a balanced professional approach.

Assessment for the course involves several independent factors. These include: quality of the individual topic article, how well learners interacted with each other, a formal business report and an engagement conversation with the client to share their recommendations. Feedback from their peers, the client, the mentor and the learning facilitators are all considered in determining the grades. This combination of authentic assessment reflects what happens in real organisations (and life generally).

Creative Melbourne learning ecosystem

Creative Melbourne is a unique learning ecosystem designed to bring creativity back into business decision making. It deliberately brings together a diversity of people from a range of countries, cultures and disciplines. It targets the fact that many of today's market leaders are relative newcomers to many industries. They achieved their success by breaking the patterns of existing thinking. Google, Tesla, Amazon and more recently Alibaba, have overwhelmed their competitors by shifting their emphasis to consider '*what is possible*' rather than continuing their focus on '*what is*'. They are co-creating a new way forward based on what they learn, as they learn it, rather than current understandings and knowledge. If

people can quickly make sense of shifts in expectations and then act on these new insights to co-create new options, they can generate a faster path to success.

Regardless of one's natural creative talent, everyone can learn to become more creative. Creative Melbourne has been specifically designed to engage participants with one another through a series of activities where the environment is conducive to sharing and connecting ideas to co-create new possibilities. Bubbles of insights form in these interactive conversations and activities are then workshopped through subsequent activities, such as social reflection. These cycles of creative interaction increase the size of the bubble and build the creative capabilities of all involved. When these iterative cycles continue over time, the maturity of the group evolves to a natural ecosystem of co-creation. At this level of maturity, the group can produce new knowledge, products and services more quickly and more efficiently.

When participants can adapt their thinking to assimilate the range of possibilities from the *known* to the *unknown*, they can stimulate more options that do not yet exist and therefore better opportunities for the future. Experiencing leaning forward into the unknown and exploring possibility, stimulates a mindset of exploration. NASA's motto of "*Lean forward and fail safely*" is testament to this. This shift in thinking enables us to connect the dots that have not yet been connected and to forge new insights. In our modern fast-paced world, those who (collectively) co-create new ideas fastest, secure the attention and respect of the customer – the ultimate determinant of sustained success (Pisano, 2015). The Creative Melbourne event generates foundations of "Co-created Projects Worth Doing" that create social value. In some cases, they also feed into the student projects of the Executive Consulting course and the pilot micro-credentialed version of this.

Executive Consulting context and insights

Participants in Executive Consulting remain fully engaged throughout the twelve-week course and encourage others to engage with the course. Feedback cites a range of key reasons for this high level of engagement including, working in a real context, the fact participants make a difference for a genuine client who is seeking their insights and make a social contribution and engage in an inclusive collaborative experience.

A group of academics at the Institute of Educational Technology in The Open University collaborated with researchers from the Learning In a NetworKed Society (LINKS) from the Israeli Center of Research Excellence (Ferguson et al., 2017) to explore what novel learning approaches might be relevant to future contexts. They generated a list of ten new pedagogies that they believe may transform education and provoke major shifts in educational practice. This list, summarised in Table 1, highlights the extent to which socialisation of learning practices can be considered of growing importance in modern learning.

Table 1 provides examples that illustrate how the Executive Consulting capstone course (EC) has included elements of all

Pedagogical Approach (Ferguson et al 2017)	Examples of aligned practices embedded in Executive Consulting
Spaced learning	There are two highly interactive intensives with weekly interactions in between.
Learners making science	All activities and assessments are based on learners developing options for real world challenges.
Open textbooks	There are no texts – learners co-create the content. The EC course also includes authentic assessments (addressing what is likely to happen in workplaces rather than theory based).
Navigating post-truth societies	Critical thinking and assessing the trustworthiness of available information is actively discussed in all stages of the learning experience.
Intergroup empathy	The course combines learners from different programmes to form blended groups around a variety of challenges. The learners also get to observe the way other groups resolved challenges for other clients.
Immersive learning	Learners engage with real business clients and play the role of consultants engaging with clients throughout the 10-week project exercise focused on real challenges facing the client.
Student-led analytics	Significant autonomy is provided to learners to develop their own approaches to creating options for the client, including openness to professionally disagree and change the direction of the project.
Big-data inquiry: thinking with data	Learners are encouraged to be completely open with data they include and how they analyse it. Visualisation methods are actively discussed and encouraged with examples provided in support materials.
Learning with internal values	There are no lectures with the predominant mode of learning being inclusive dialogue and 'Creative Friction' (constructive disagreement to develop professional knowledge, skills and 'being' – open-minded professional behaviour and ethics).
Humanistic knowledge-building communities	The whole design of this course aims to stimulate open experiences, highly creative approaches and self-directed development. The people-centred approach adopted generates collective knowledge co-creation as a community with the aim to enhance the performance of the client and stimulate social learning for all participants.

Table 1: Practices identified to be likely to enhance learning outcomes in modern contexts with examples of implementation from Executive Consulting capstone course (EC).

of these ten pedagogies. Rather than try to design a course based on one or the other, all ten have been embedded into the learning interactions to create a full immersive experience.

The contextual and institutional environment in which educational offerings such as Executive Consulting reside is key to their success or failure. A pedagogical approach which eschews rigidity and encourages agile creativity would have little prospect of enduring success within a rigid institutional context.

The overall programme design for the RMIT Executive MBA (EMBA) programme exhibits a number of features which make it conducive to a divergent course offering of this nature. The aim of the programme is to be innovative, global and applied. Its goal is to develop leaders who exhibit socially responsible, ethically aware leadership, grounded in design thinking. This means students are encouraged to analyse the architecture of business problems and to understand the value that prototyping, creativity and synthesis bring to the creation of sustainable solutions that are end-user-driven. The programme has a specific objective of equipping 'work-ready' graduates with the skills to effectively drive innovation and change so as to create ongoing value for their organisations and the communities they serve.

An emphasis on Design Thinking helps to achieve these goals through a focus on socially responsible innovation. Design Thinking techniques have been infused in a range of courses in the EMBA which students undertake prior to their enrolment in the Executive Consulting capstone. The

importance of design and design thinking as a tool for innovation has been recognised by both businesses and governments over the past two decades. Companies such as Apple, IBM, Pepsico, Samsung and Dyson have used design to deliver experiences that have created value for their customers and organisations (Ignatius, 2015; Kolko, 2015).

A programme self-assessment report undertaken as part of the European Foundation for Management Development (EPAS) accreditation process in 2016 affirmed a central theme that permeates the Executive MBA Programme objectives: "As cities and countries contemplate new ways of becoming and remaining competitive, it is clear that success requires an ability to solve problems from a variety of perspectives and that new ways of thinking and innovation are central to productivity and prosperity" (Farrell, 2016, p. 23). The curriculum design for the programme emphasises action learning and reflection on learning experiences, taking account of work undertaken at Harvard University as outlined in the book Rethinking the MBA (Datar, Garvin & Cullen, 2010). Building upon work undertaken by the US Army the authors argue that leadership always involves three interrelated components: "knowing", "doing" and "being". In brief, there are things that every business leader should know, things that every business leader should be able to do and a third component of values, attitudes and beliefs.

Introducing the Applied Social Learning Ecosystem (ASLE)

Traditional formal education is unidirectional and hierarchical. This is good for efficiency and can be easily controlled by curriculum and procedures. However, learning is limited to what is known, and students are rewarded for rediscovering existing knowledge. This works well when there is a definite set of known facts that need to be transferred to the next generation and where the knowledge is relatively static. However, business and societal environments are constantly changing. In VUCA environments, success is less about knowing what is already known and more about the capabilities to resolve complex challenges under conditions of uncertainty. In fact, sometimes what we do know holds us back from being able to see the new possibility. Patterned thinking can lead to cognitive bias that prevents new insights, because people subconsciously reject some possibilities before they consciously consider them. This type of hierarchical pattern reinforcing environment has been referred to as an EGOsystem (Scharmer & Kaufer, 2013), because it assumes some people have more valuable knowledge than others and the answer already exists for many future challenges.

This paper proposes that a better way forward is to engage learners in an immersive experience in an Applied Social Learning Ecosystem (ASLE – refer to Figure 1). In a natural ecosystem, everything is interdependent and harmonised (Scharmer & Kaufer, 2013). In complexity science, it is acknowledged that each participant and intellectual asset has an influence on the other elements of the system (MacGillivray, 2006; Snowden, 2007; Vidal & Marle, 2008). When these principles are applied to learning environments, the flow of knowledge between all the component parts is

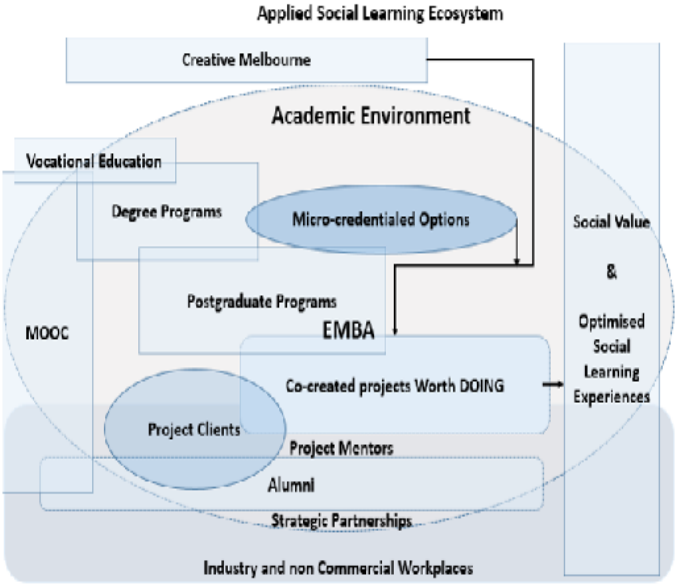

Figure 1: The Applied Social Learning Ecosystem being created to support "Lifestyle Learning".

optimised and the outcomes enhanced. This approach is more aligned with systems thinking (Stacey, Griffin & Shaw, 2000) which considers independencies between elements rather than just component parts. Designing learning programmes from this perspective leads to very different outcomes, as we have discovered with the two examples shared in this article demonstrate.

Success factors in applied social learning ecosystem design

Most current education approaches are broken into components by disciplines, so the learning about different subjects is done completely independently. In an Applied Social Learning Ecosystem (ASLE), the learning experiences relate to real life situations that are familiar to the learners' contexts, so they have relevance and all topics are explored within the client context. Furthermore, the educational experiences from one level of learning (primary, secondary to tertiary) flow in a way that the learners broaden and deepen their knowledge and insights in a more interconnected way.

Designing learning experiences for ASLE requires a reverse mindset. Rather than considering how to 'discover' existing ideas and concepts and discussing what they are, an ASLE engages learners in exploring what is missing and *what is possible*. That is, the design mindset moves from convergence to find existing objects for tangible outputs, to divergence

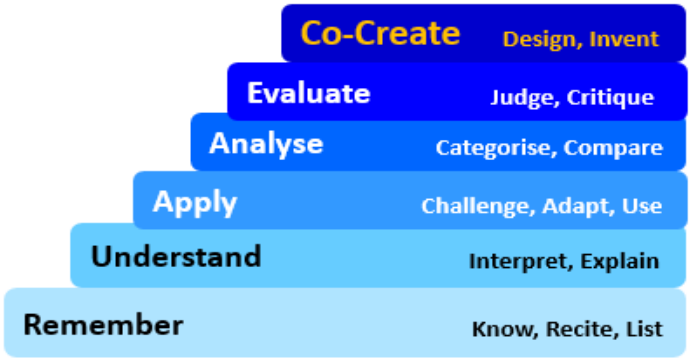

Figure 2: Learning Hierarchy adapted from Bloom.

to generate possible future options and outcomes. This generates a higher level of comfort with uncertainty and greater confidence to co-create options around unknown challenges (the biggest challenge most organisations and employers face).

The key factor to enhance ASLE success is to ask provocative questions about possibilities. EC has only supporting content and there are no lectures or tutorials. The learners co-create all the content within the context of a real client project. The philosophy that a good provocative question deserves a provocative response to stimulate respectful and robust argument combines the ideas of KNOWledge SUCCESSion and "Creative Friction" (Shelley, 2017). Facilitated disagreement can stimulate creativity and innovation, if the learners engage in a constructive dialogue and respect the ideas offered by others. Without differences in opinion, we limit sources of new possibilities and new opportunities.

When people disagree, the most likely outcomes are rejection or conflict. However, when participants are experienced in facilitating creative friction, there is an increased opportunity to understand the relevance of why other opinions and interpretations are important. This not only opens minds to other possibilities, it builds stronger relationships between the parties involved. When one can accept another's 'reality' in parallel to their own views, they have a more complex understanding and move from linear decision making towards complexity. This leads to superior learning that reflects a higher level on Bloom's hierarchy (Bloom, 1971) as shown in Figure 2. Learners are co-creating based on more knowledge, deeper understanding and better analysis leading to better judgement and generation of new possibilities. It highlights the limitations of what many think education is about – filling peoples' minds with what is already known. In contrast, the ASLE approach is about opening minds to generate the highest quality learning outcomes. In opening minds to new (and perhaps multiple parallel) possibilities, it is often necessary to break accepted patterns of thinking, practice and behaviour (Knowing, Doing and Being).

Images, videos and artefacts used in the learning experiences do not contain the answers, they are the "conversation starters". Creative visualization is a powerful tool to start conversations as they are metaphorical rather than literal. When you look at a stated problem, you focus inwards on the "facts of the matter". However, when one looks at a creative or metaphorical image, one's mind is exploring and seeking to make sense of it. This divergent mindset exploring the object from an oblique approach will make connections between the images and their understanding of challenges they face. The shift in attitude stimulates a range of ideas and themes that do not emerge when focusing with convergent thinking.

To achieve the mindset and behavioural changes, the design of learning activities and assessments are very different to traditional education approaches. Encouraging disagreement, maximising collaboration (sometimes perceived as 'cheating' in traditional education) and co-creating new knowledge and insights though socialising and reflecting on differences are all deeply embedded into all activities. Games are played to encourage divergence of thought and are then reflected upon to ensure the participants understood what happened and why. There are always some participants who are initially uncomfortable with the uncertainty, but this soon passes as they see the logic and emotional development that comes through the experiences. Learners are encouraged to explore new emerging concepts such as Artificial Intelligence (AI), the Fourth Industrial Revolution (4IR) and the Internet of Things (IoT) and discuss what possibilities these may bring to their future and that of their client, to further open their minds to change and its implications.

Impact is a significant motivator for learner performance. They engage more deeply when they know what they are contributing to is making a difference for organisations and society. In its first three years, the Executive Consulting course (EC) has arrived at recommendations for over forty organisations, including fourteen Not-For-Profit and community associations, five government clients, eight start-ups, twelve small-to-medium enterprises and two multinational corporations. Most of these organisations did not have the internal resources to perform such a significant project in their business, nor the budget for external consultancy. The social value generated by these Co-created Projects Worth Doing, is significant and has assisted many clients to accelerate their performance. The feedback to the learners from the clients, mentors and facilitators stimulates continuous improvement and inspires ongoing lifestyle learning across a balanced set of capabilities. Strategic partnerships between academia, industry, government, mentors, learners and learning facilitators are the fabric of the ASLE. The development of trusted relationships to generate mutual benefits are essential for sustained social value contribution.

Implications for future learning facilitation

For most people, developing and growing their capabilities is about being able to perform at a higher level in their chosen field (or gaining access to that field). Optimising personal and professional capabilities is about harmonising:

Knowing - Understanding why things happen at deeper levels,
Doing - applying and refining your talents and skills) and
Being - the behaviours you display and how you interact with others.

When learners undertake this journey, they are constantly on a path of becoming – something more, or different (Shelley, 2017). The biggest challenge in the modern world, is being confident about which direction to take because of the VUCA environment (Volatility, Uncertainty, Change and Ambiguity).

What we do know, is that much of the content taught in traditional education institutions is no longer relevant to the workplace (Robinson, 2016). It may be personally rewarding to learn about outmoded concepts from an historical perspective, and sometimes existing insights can be leveraged to learn how to adapt an idea for a future

context to create practical outcomes, but more often this is not the case. The World Economic Forum's (2016) list of the most important future skills emphasises soft skills more than content-based capabilities. This highlights the imperative for education to develop the ability to learn efficiently and effectively. We have already moved away from an understanding of learning as something people did before they went to work, to the concept of lifelong learning. A new shift is underway to lifestyle learning – learning that fits into the rapid pace of how we live with high levels of mobility. This gives rise to a conundrum: without ongoing learning, we quickly become irrelevant, but many people are too busy to step away from their frantic work activities to commit to full time significant formal courses.

This time-poor mobile situation suggests the future of credentialed learning will evolve into micro-learning programmes (discussed in the section below). To some extent, many professional societies are already implementing a version of this through their requirements for ongoing professional development to be proven via a points system. Professionals in accounting, legal and other disciplines such as medical practitioners are required to provide proof of completion of a certain number of courses approved by the professional association. These are often done as small units or workshops of four to ten hours and usually require some type of assessment (as opposed to just attendance) to deliver the necessary credibility required by their profession associations.

There are some existing examples of ecosystems like ASLE, but they are few and far between. The Bamboo School in Thailand has been successfully operating for some time (2018). Students of the Bamboo School run the school as a business and this is how their learning happens, integrating theory and practice around agricultural projects, science and technology programmes and business (by selling products generated to the village). Another example is Blackmagic Design (BMD, 2018), a broadcasting products and services business that outperforms many much bigger players in the market in both price and customer service offering. They have no hierarchy and all employees are directly involved in delivery of products through creative circles, similar to the concepts of Holocracy (What is Holocracy, 2018). BMD remain a small, fiercely independent organisation that has won over 200 international awards for their products and services. They do this having everyone in their ecosystem completely focused on customer desires and delivering these faster than anyone else at higher quality and lower cost. Grant Petty, the owner and managing director of BMD, stated at the 2018 National Association of Broadcasters international show in the USA:

> We are creating as much freedom for creativity as we can… I don't know what kind of blend of technology and creativity will come together from this… I am fascinated to find out … We just do these things and think it sounds right, and it will be interesting to see what happens (Petty, 2018).

Mr Petty has no doubt that the organisation's openness, inclusive creativity, collaborative approach and lack of hierarchy are key drivers in its sustained competitive advantage (Petty, 2018).

Extending the ASLE through micro-credentialing

Micro-credentialed learning is growing rapidly and is often accompanied with electronic badges or certificated for specific recognition of the learning outcomes achieved. These badges are controlled by the issuing party (university or private provider) and can be shared through social media platforms to demonstrate acknowledged capabilities in specific areas. Whereas a traditional masters degree programme typically involves twelve to sixteen courses of twelve credit points, a micro-credential badge may be three points and be completed in a weekend workshop followed by a report or other assessible artefact.

Micro-credentials are rapidly becoming popular with learners and employers alike, because they offer the opportunity to engage in a diversity of topics, or focus on a highly specific area. Independent learners have the opportunity to personalise their development investment to what interests them, rather than being forced through a broad programme. It also provides the flexibility to do learning at times and locations convenient to the learners rather than having to engage in the fixed large institution's agenda. This personalisation for learners can also work well for employers as they can engage with a learning provider to create a specialised course aligned to their current work practices.

In addition to flexiblity and personalisation, micro-credentialing is gaining popularity for other reasons. Its appeal includes the following factors:

- Interdependence, new knowledge uptake and scalability. Many modern roles require a range of broader skills as well as depth in some specific areas and these can change rapidly as interdisciplinary roles become more normal. For example, technology competency is now an expectation in almost any role, so the ability to quickly reach a competency in a range of new technologies can be helpful, especially with a highly mobile workforce. Adding a new mini-course can be achieved quickly and proves more flexibility to include new concepts.

- Official recognition from an official provider for a range of capabilities including soft and hard skills. Although some of these skills can be gained in the workplace, the microcredential 'qualifies' the skills and knowledge, so that other employers can be confident they have been attained to a professional level.

- Currency of the topics can be more easily maintained in small courses, with on demand delivery and effective tracking and records. This provides greater agility to maintain relevance when rapid technological and sociological and societal changes are challenging individuals and organisations to keep up with changes.

- Micro-credentials align with the principles of 70:20:10 forum (2018), where significant learning can happen away from the formal learning place and then be ratified with a microcredential to demonstrate the acquisition of competency and knowledge. A micro-

credential approach enables learning on the job to be officially acknowledged, for both compliance and also just personal development.

- Cost effectiveness. It is lower cost, lesser risk and easier to engage in a micro-credential initiative than in a larger, more rigid programme.

- Lifestyle learning. Micro-learning experiences can be provided in more mobile ways such as during commuting.

- Social learning. The best microlearning experiences will leverage all of the concepts above to bring together mobile, flexible approaches which engage learners with each other to co-create new options rather than learn existing content. This provides a solid foundation for future ongoing learning aligned with changes in contexts, challenges and opportunities.

There is little doubt that ongoing learning is a factor in employee engagement and that this in turn impacts critical elements of performance such as productivity, staff turnover and competitiveness. The features listed above were always factors in learning, but the increased use of mobile applications makes integrating them easier. Agile (Morris & Ma, 2014) and Design Thinking (Brown, 2009; Liedtka, King & Bennett, 2013) approaches to software development and project management generally help to accelerate possible options for faster and more effective learning. The socialisation of learning (drawing on everyone's experiences, rather than just what a 'teacher' knows), can lead to the situation where co-creation of new knowledge is the optimal way forward for learners to interact, both as learners and as practicing professionals. Learning experiences can be brought back into absolute relevance by combining micro-learning with real-world experiences to accelerate performance.

So how do we regain our creativity through applied social learning?

Regaining creativity involves stepping out of our comfort zone and experiencing alternative ways forward. Creative social learning does not come from doing a weekend course in creativity and then going back into the workplace and playing a few games. It requires a mindset shift and behavioural changes to be applied over time to develop competency and confidence in the new approach. The initial experience of creative social learning interventions excites the brain, but new concepts are hard to sustain until they become entrenched as new practices or habits (Duhigg, 2012). Many people love to watch TED videos (TED, 2018) and be inspired by them. Whilst this can excite and create awareness, it mostly does not translate into ongoing applied capabilities. Success requires an open mindset, combined with a willingness to explore the unknown with persistence.

Optimal learning is not about discovery of something that exists. It is about co-creation of options around what does not yet exist. This is where the true opportunities for future leaders lurk. Sustained success is dependent on our behaviour and willingness to step outside our comfort zone and remain there to expand our circles of influence and scope of knowledge and develop depth of capabilities.

Creating social benefits is a motivational factor for learners. Knowing that what they produce is real, and will be acted upon, engages the learners to proactively invest and this enriches their learning experience. Early indications from feedback are this has made a positive contribution to everyone involved including some benefits to wider society. Examples of this from the last twelve months alone, include projects that have contributed to acceleration of a charitable project delivering refugee camp sanitation improvements, supported mentoring for refugees now living in Melbourne and enhanced the knowledge capabilities of Victoria's Country Fire Authority. Private sector clients have provided feedback that their engagement with an ASLE has enabled them to strengthen their businesses, with several clients motivated to return for subsequent projects. As new projects are implemented, further longitudinal research will provide additional evidence of long-term social benefits of this approach. This will help others to adopt these ideas and expand the impacts of this type of learning and on the importance of the ASLE in this.

This paper does not prescribe one way to achieve the learning outcomes. It is an overall approach and success will depend in providing quality client projects which are relevant to the learners' passions and which generate social outcomes. An open style of learning facilitation is also required to ensure a high degree of autonomy for the learners to explore and reinforce open mindsets.

This paper shares the ASLE structure and approach, so that other learning facilitators and researchers can conduct deeper and wider social research. As others pilot and challenge the approach, a collective understanding of how to further evolve it will emerge. We encourage exploration based on the principles described and creating an interdependent ecosystem for learning, rather than the specific activities done in this programme. Simply copying the activities we have described, which were designed for specific sets of learners, will not lead to optimal outcomes. We do not intend to advocate the specific activities which formed part of the programmes described in this article. We suggest using an ASLE approach with a design aligned with other programmes' objectives and contexts will achieve improved quality learning outcomes.

Conclusions

The design of learning experiences around real situations, involving real clients who have genuine constraints, enables learners to develop the capabilities they need to become more committed team members exhibiting higher performance and exerting a positive influence on those around them.

Social learning experiences enable people to optimise personal and professional capabilities to balance their development across the three key elements of capability, **Knowing**, **Doing** and **Being**. The Applied Social Learning

Ecosystem (ASLE) stimulates interactive socialisation of concepts across boundaries to share differences of perspectives. The ASLE engages learners to become more conscious of their journey of **Becoming** (a more capable person) and the impacts this will have on their performance. This greater self-awareness of what one is capable of achieving (alone, or preferably, with others) enables more effective learning experiences. When learners are aware of the way in which they are learning and how this enables them to accelerate their learning outcomes, they enjoy the experiences more and are more deeply engaged with the experiences and with their co-learners.

Beyond the personal benefits, there are early indications that the approaches to social co-creation of new knowledge outlined in this article can bring commercial benefits as well as benefits for wider society. In this spirit, we share the ASLE structure and approach to encourage researchers to conduct deeper and wider social research that helps validate the long-term benefits of this approach and that will assist others to deploy these ideas. This article does not prescribe a single way to achieve learning outcomes.

The article describes an overarching approach which hinges on the learning designer's skill in providing quality client projects relevant to learners' passions. We advocate exploration based on the principles described to create interdependent ecosystems for learning adapted to new contexts. The design of new programmes to achieve quality learning outcomes should be based on approaches that are appropriate for other groups of learners in their particular contexts.

Our description of the diverse learning experiences outlined in this article is designed to leverage perspectives through constructive disagreement and demonstrate that there are a myriad of ways to achieve successful, tailored outcomes. As others pilot and challenge the approach a collective understanding of how to further evolve it will emerge.

We encourage you to join us in this ecosystem of the permanent unknown. We don't put people and things into boxes, we remove the constraints and open minds to a world without boxes. In doing so, we create new insights that simply cannot be boxed and continue to evolve them! Once you have seen the creative possibilities, you cannot unsee them!

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Christopher W. Harris

Executive Dean, Academic & Industry Engagement, Kaplan Higher Education Singapore

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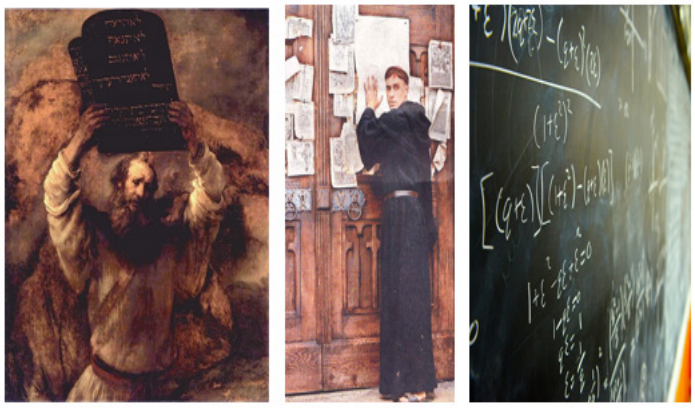
Moses preferred a tablet or two to support his didactic classroom management style, Martin Luther was known to have posted theses as much as 95 times in one day on his wall, and school teachers moved from notes on blackboard to notes on Blackboard© (Figures 1 a-c). It seems the preferred Learning Management System (LMS) Platform changes even when the names don't and the space has never really been won (Spectrum, 2018). In the arguably post-LMS Schools of today (Mott, 2010) where digital is ubiquitous, technological affordances abound (Glowatz & O'Brien, 2018) and lines are increasingly blurred between levels and sectors of education and training, the choices for education decision-makers from where they may minimally host materials to an environment where whole courses play out and everything in between are varied and alluring. However, educators find ourselves like Pi, sometimes agnostic and uncertain as to which to employ yet, at other times polytheist, taking sup at the altars of one platform supplier after another.



Figures 1-3: Early Platforms (ltr): Rembrandt's Moses Breaking the Tablets of the Law (1659); Luther (Dir.: Till, 2003), protagonist nailing 95 theses to his platform of choice; the blackboard (Queen's University Belfast).

Case in point 1. In days gone by, I was involved in the approval of a capital expenditure on an Enterprise LMS in the six-figure range only to then revert to open source not six months later. Such a strategy as this was not enamoured of the Board of Governors, but it was nonetheless necessary for that institution to remain nimble and for the digital experience to be commensurate (i.e. to at least be considered) with that which learners were having in their increasingly pervasive virtual social life. In this vein, Moodle once morphed into Moodlebook (the conjunction, to distinguish it from the current Moodle Book) and Blackboard into Blackboard Synch, both augmentations of their regular learner interface towards the kinds of aesthetic and User Experience (UX) the Social Media site Facebook had pioneered, thereby "effectively transporting the LMS to Facebook" (Harris, 2012, p. 808). They may have been none-too-successful experiment initially, but were nevertheless brave examples of two very established players self-disrupting and gave the industry important preludes to today.

Figure 4: Moodle LMS goes Social. A Malaysian Instructor's Moodlebook.

For today exists everything from behemoths like Microsoft with its Teams and other software to small start-ups offering end-to-end services that represent a kind of education translation service for the 21st Century. Take, for example, Singapore's UpnextEdu, which offers services to help educators "adapt to the needs of our digital natives by adopting collaborative and active learning pedagogies, delivered through leveraging on technology affordances which helps the teacher in facilitating and automating the learning process" (upNEXTedu, p. 2). These diverse providers co-exist and battle to win the love of lecturers and learning leaders and drag them like a cursor into the 4th Industrial Revolution.

Yet with change comes pain and identity crises now loom large; educators are being asked to be curators (Siemens, 2008), architects (Woods & Ebersole, 2003) and even good ol' Deans like me are not immune as we transform into what must resemble an Orwellian creation: the Chief Learning Officer (Woodill & Fell, 2006). With so much innovation and change. Ed tech is apparently winning, but the choices get more complex for the end user and so many choose none (Spectrum, 2018; Glowatz & O'Brien, 2018).

That which is unavoidable is the move to mobile and mobile-responsive platforms (Sarrab, Al-Shihi, Al-Manthari & Bourdoucen, 2018). Case in Point 2 and another of my failings (this is quickly becoming an exercise in self-flagellation). As far back as 2014 when working on a blended learning design, was to assume part-time working adult students in Singapore would use a PC for most of their online learning. Actually, our post-analysis of their usage via the Moodle LMS Analytics for version 1 (n= 2,850 students) found only 10% of the students regularly used a PC, whereas 65% used a mobile phone and 25% a Tablet/PDA device (Harris, 2016).

Within this context, enter Gnowbe.

The Pitch

In their own words, "Gnowbe is a pioneering mobile micro-learning and engagement solution to help the modern workforce learn faster and better" (Gnowbe, 2018, p. 1). Big claims indeed. Very much a mobile-first platform targeting employers' Learning and Development departments, Gnowbe's business model relies on partners developing content for the platform.

Gnowbe claims to respond in its design to the literature on "latest science of adult learning, gamification and behavior design" (Gnowbe, 2018, p. 1). Leaving aside the latter two concepts as debatably peripheral to this publication, Gnowbe's adult learning science premise and resulting product channel concepts like peer and social learning and does so in a time the aforementioned Moodlebook designers must envy. For this is a time where the affordances of a less hard-coded, more format-responsive digital ecosystem enable more variety of media within the one platform and blissfully sans Scorm packages (a joke for the techies). Variety can be good for learning (Kagan & Kagan, 1994) but so is time (Soderstrom, Kerr & Bjork, 2016). However, Gnowbe is hedging its bets on a relatively new – the literature is sparse before the 1990's – but increasingly trendy concept, Microlearning or, specifically, Mobile (M-) Microlearning.

When I first heard of Microlearning, I cringed and immediately judged it as a further extension of the kind of paradox of knowledge The Editorial in this JALT Volume speaks of; as though, in an inversion of Moore's Law, humans were increasingly able to pack in less learning and that Microlearning was just the natural endgame for the distracted. Gnowbe even claims its use requires a 'small cognitive load' as though this is a positive (see Figure 6c). However, the closer truth is that its roots are as a way of segmenting of learning into its parts, like mini scaffolds (Gassler, Hug & Glahn, 2004; Millwood, 2000). It does have its supporters in the elite institutions as well. In this very volume, Shelley and Goodwin (2018) argue that:

> The best microlearning experiences will… bring together mobile, flexible approaches which engage learners with each other to co-create new options rather than learn existing content. This provides a solid foundation for future ongoing learning aligned with changes in contexts, challenges and opportunities (p. 34).

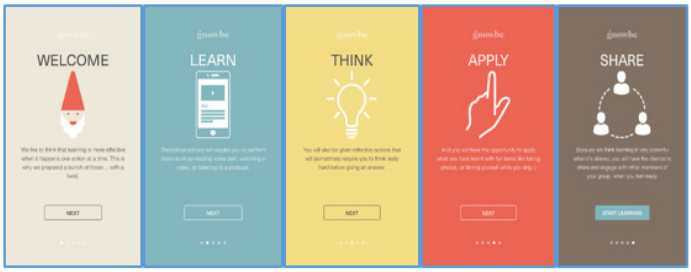
As the following road test shows, Gnowbe is to this reviewer at least mobile, flexible (no active release) and engaging in its design, but whether the co-creation of knowledge is as utilised as it could be was not reviewed in full.

The road test

Limitations: The following reflections are based on the experience of an academic in a higher education setting and so the lens through which I view Gnowbe is a little aside from its intended user, those in the corporate learning and development paradigm. To mitigate this, I have chosen a Polytechnic Diploma course more in line with the kinds of curriculum I deal with daily. A second limitation is that this is admittedly a cursory experience with Gnowbe as a student/trainee/learner of the log-in, onboarding on the app and the Introduction to Digital Marketing course on which the folks at Gnowbe very magnanimously let me enrol. I also have fat fingers not evolved for smartphones, but let's leave those to one side.

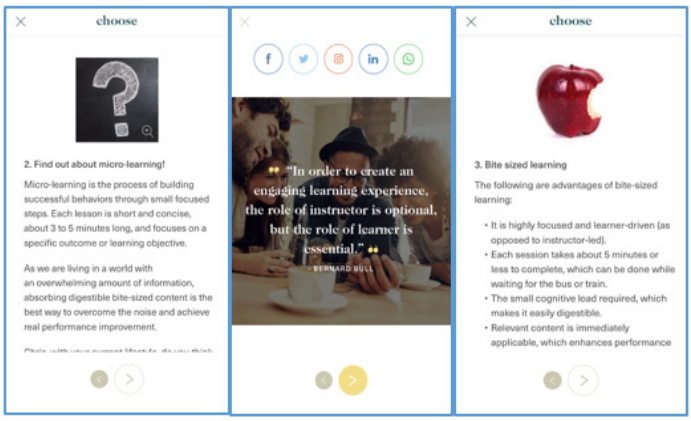
Overview of the roadtest: I was enrolled for 36 minutes in total which covered two sessions (topics) - Introduction to Microlearning (read: Gnowbe) and Introduction to Digital Marketing, the latter of which is the first of 14 sessions on the eponymous course – and completed 25 actions (activities). Given the notion of bite-sized, five-minutes-a-day usage at the heart of Gnowbe's disruptive approach, 36 minutes (with over 20 minutes on the on-boarding) was deemed representative of a normal first-time user experience.

A. Orientation – On-Boarding: Platform, Pedagogy Pitch and Programme (Course)



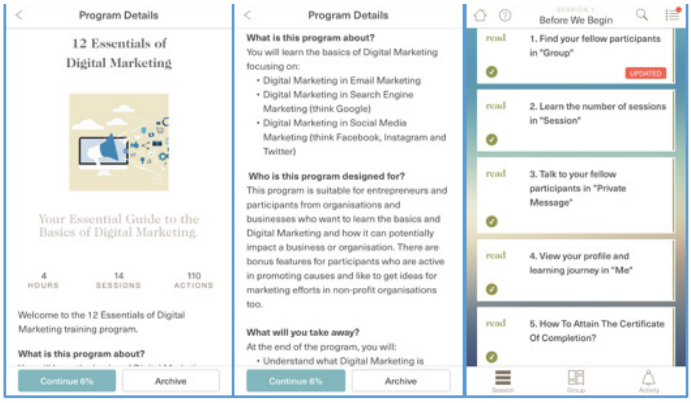
Figures 5 a-e: Gnowbe platform step-by-step on-boarding.

The on-boarding (induction) to the Gnowbe App was neatly scaffolded and the experience mirrored the content regarding the Gnowbe Pedagogical model of "Learn, Think, Apply, Share" in that while learning about the model I was concurrently applying it so that, like all well aligned instructional (lesson) design I, the learner, was starting as the instructor intended me to go on. Layered over that fluid navigational experience was the constant content about the "essential" role of the learner to act and participate in achieving learning outcomes (see Figures 6a and 6b) again while I acted and participated; however, I'm not sure if I achieved the Learning Outcomes though which perhaps might have been reintroduced later in the course. Overall, the on-boarding to the platform was easy and elicited from me the very behaviours I would need to complete the subsequent sessions.



Figures 6 a-c: Setting the expectations of the learner as essential to 'drive' his/her learning.

Similarly, the introduction to the programme (course) proper was paginated for the medium of mobile, with expectations and outcomes well expressed and the content succinct. Yet, it was at this same junction that I begin to see the limits of learner-driven as distinct from learner-centred design in that the curriculum was clearly organised by traditional content ("Sessions") and temporal ("Hours") orders save for the "actions", which at least spoke to some thought having been given to what the student did (Biggs, 1999). Notwithstanding the lack of active release which made navigating fairly free, there may be a level of AI missing which would truly allow the experience to be learner-centred in the sense of the machine learning here to pick up on the specific learning mastery of the learner and respond accordingly.

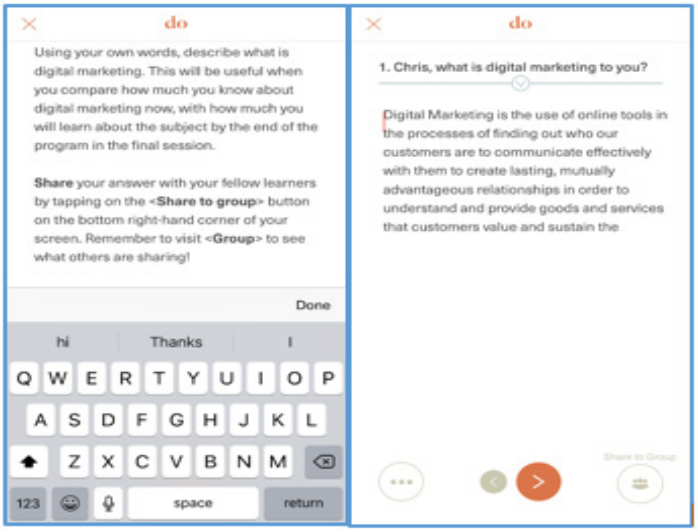


Figures 7 a-c: The Programme (Course) Proper On-Boarding.

The emphasis on the learner familiarising him/herself with the social aspects of the app (see Figure 7c) were clear though and this is where the app can really distinguish itself from other media. Being able to share, read the opinions of other learners on a discrete piece of shared content and then share again on a platform that is well designed for the display of such content is a big step towards social and peer learning advances. The role of the teacher in this could be as guide, facilitator and even quality assurer. Here the work of Vygotsky and others on the importance of 'knowledgeable others' within the learner group is important in assuring the learning.

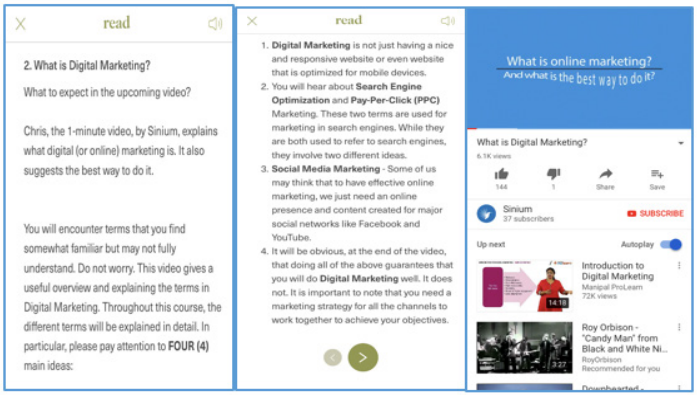
B. The Learning Journey through Gnowbe – Introduction to Digital Marketing (content by Temasek Polytechnic, Singapore)

The course proper started with me, the learner, having to post an answer to the fundamental 'what is' question (Figures 8a and b). This was the virtual equivalent of the teacher check of assumed knowledge or pulse check on what I already knew. Here I found the limits of screen size meant I had to minimise the sub-text to the question and just leave the questions itself (Figure 8b) but I commend the approach allowing the learner to "compare how much you know now…with how much you will learn by the end" (Figure 8a, p. 1).



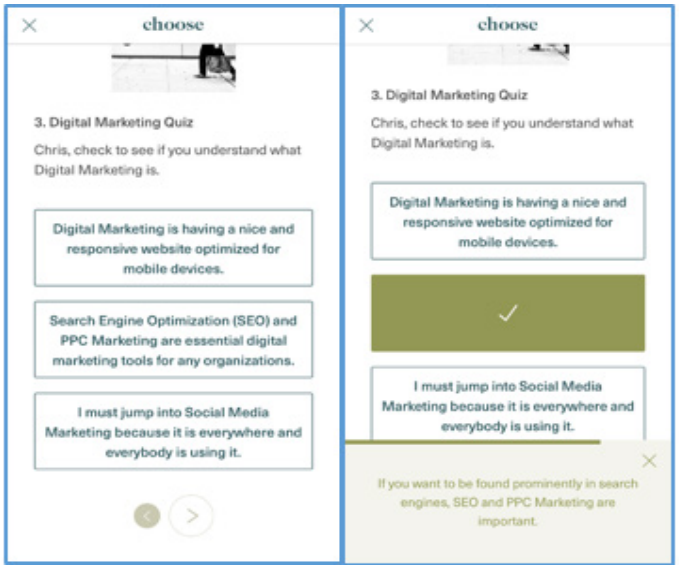
Figures 8 a,b: Course Begins. Checking Assumed knowledge. The first 'do' activity and my response (pre-test).

The app required a response to move on so the promised emphasis on learner activity was reinforced. Again though, I wondered whether my response was on the right track (or worse, was I even close?) and a machine learning improvement might be able to perform a quick content analysis and highlight those key terms related to the instructor's definition and those missing, much like a face-to-face teacher would do.

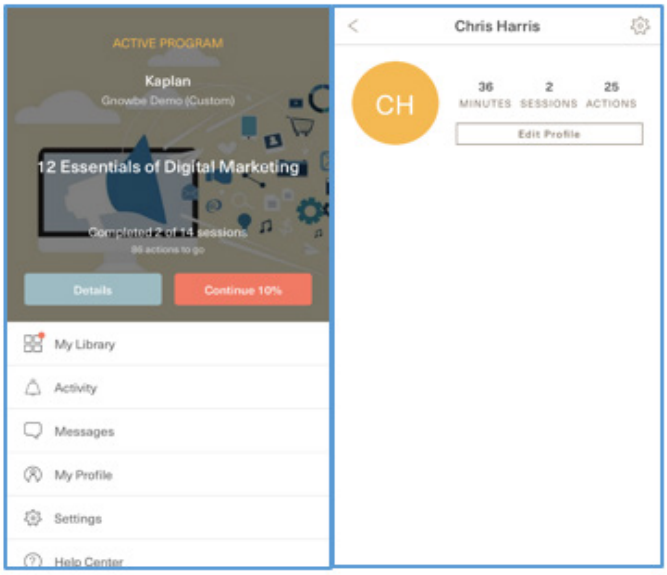


Figures 9 a-c: Course Begins. Introductory content, video pre-reading and video.

The next "action" I had to perform was to watch a video. The transition from the introductory text (itself a good strategy for focusing the learner and reminding them the video is a text) to the video is seamless. Leaving aside the video content (I assumed Sinium has approved the use of its IP), the immediate follow-up Multiple Choice Question made for a very smooth prepare-experience-reflect journey as the learner. The extra content on correct and incorrect answers also enhanced my understanding (bottom of Figure 10b).



Figures 10 a,b: Quiz to end (post-test) with additional reinforcement around the correct answer.



Figures 11 a,b: Summary of Activity for DM Course and overall on the app.

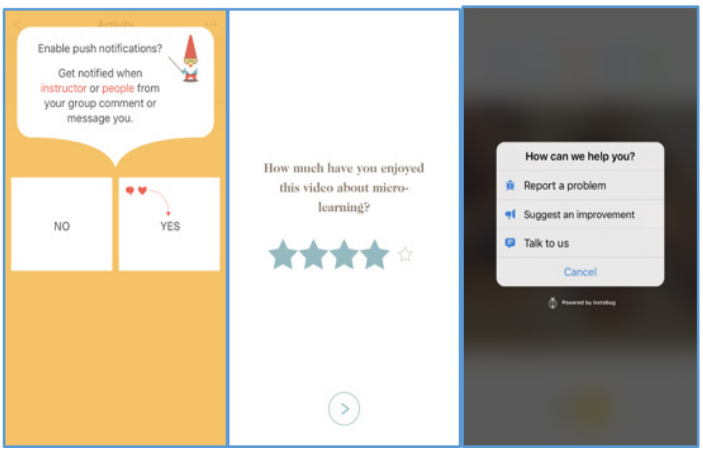
On completion of the session, I was readily able to see the numbers in terms of minutes spent on the app, sessions and actions which would be useful for the kinds of reporting needed and for building the intelligence of the system. Perhaps with time and a bigger user experience data set, the app could show me where my learning actions were statistically 'faster' or 'slower' and ask for feedback on why. Classroom teachers would call these interventions and use tools like 'Muddiest Point' (Mosteller, 1989) or other questionnaires to elicit the students' feedback on their own learning and they are useful markers for teachers to discover misunderstandings and troubling concepts with which to then customise learning plans. Gnowbe might wish to translate these sorts of technique into the app.

C. Other Features of the Gnowbe App:

In a conversation with co-founder of another learning app Quitch, Dr. Grainnie Oates, I was surprised to find out that in her testing of students in the pilot University in Australia, the students had actually requested to receive notifications when deadlines loomed for work needing to be done (Personal communication, January 17, 2017). Oates had initially recommended not to do this in case it encroached on the students' social life, a concern former subjects of mine likewise expressed in research I conducted on their experience with Facebook in learning (Harris, 2012). This may reflect a change in acceptance of formal learning within the social milieu of students. Whatever the case, Gnowbe's other features include the right to opt in for notifications, which should help learner traction to the app (12a) if the Quitch experience is the guide.

The other feature I found quirky and quite intuitive was the immediate offer of assistance when I screenshot the images presented herein (Figure 12c). This was clearly the result of a UX insight and, while I didn't pursue the offers, I could see how it might be useful and timely.

Lastly, the app contained the usual star rating on satisfaction (Figure 12b). Timely data collection is a worthy endeavour in all teaching and is arguably made easier with technology, but measurement of 'enjoyment' without other pertinent questions around the rigour of the content, the clarity of meaning or another measure of efficacy for learning that might be more worthwhile for the instructor, was distracting. Such subtle changes as these would elevate the value of the app into spheres of learning other than corporate training.



Figures 12 a-c: Push, Pull and Predictive? Option for push notifications, a quick survey and help predicted on screenshot.

Overall, notwithstanding that this reviewer is looking through the lens of Higher Education into an app designed chiefly for corporate Learning and Development, the experience of navigating the app, its ability to seamlessly link multiple media formats and the variety that this creates for the learner experience were noteworthy. Furthermore, given Gnowbe is a platform provider and not chiefly a content creator (Gnowbe works with content providers), there is much to be said for its responsive capability and the ease with which a non-technical instructor can input content. The fact that it is also 'built-for-mobile' meant problems of lengthy pagination, missing powerpoint content and other side effects of LMS systems viewed through mobile browsers were non-existent.

In terms of the efficacy of Gnowbe for learning, no real account can be given as to the effect of my experience to see how microlearning impacts on my long-term retrieval of the lessons at this stage so none will be ventured. Suffice it to

say, these kinds of questions should be posed by Gnowbe or any organisation in this space, and the commitment to the research and scientific work needed to answer them needs to be done. Related to this, the only other recommendation I would reiterate is for Gnowbe to delve further into Artificial Intelligence and the advanced affordances it would provide in personalising the learner journey and providing an even richer data set for stakeholders including the learner, corporation, institution or instructor.

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40,000 Hours to Create a Robot Gardening Business and other Futures for Education and Training. An Interview with Dr Bror Saxberg, VP Learning Sciences, Chan Zuckerberg Initiative.

Bror Saxberg[A]

Christopher W. Harris[B]

Jürgen Rudolph[C]

A *Vice-President, Learning Sciences, Chan Zuckerberg Initiative*

B *Executive Dean, Academic & Industry Engagement, Kaplan Higher Education Singapore*

C *Senior Lecturer and Academic Partner Liaison, Kaplan Higher Education Singapore*

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evidence-based training and education;
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mastery;
metacognition;
m-learning;
neuroscience;
personalised learning;
transfer of learning.

Abstract

JALT's editors Christopher Harris and Jürgen Rudolph spoke to Bror Saxberg, who is currently the Vice-President Learning Sciences of the Chan Zuckerberg Initiative (CZI), a not-for-profit organisation founded by Facebook CEO Mark Zuckerberg and his wife Priscilla Chan (a medical doctor). Amongst other things, CZI has the audacious goal of curing, preventing, or managing all diseases "in our children's lifetime" (Farr, 2018). In a wide-ranging interview, we began with Dr Saxberg's lifelong learning journey from pure research to being a 'learning engineer'. Other topics include: the promises and pitfalls of e-learning (including m-learning); the 'undead' lecture as an enabler for 'learning tourism' and the importance of practice; the importance of metacognition (that we know how to learn) in mastering multiple, difficult-to-automate skills and competencies in a lifetime of continuous learning in a world that changes at breakneck speed; how we can create top performers and maximise corporate potential via evidence-based training programmes; the paradox of knowledge (our ignorance increases with more knowledge); and key teaching strategies for a personalised learning approach and promises of neuroscience. We have divided the interview into ten parts.

1. From researcher to 'learning engineer' – from pure research to application at scale

Eds.: Thank you so much for agreeing to this interview. We very much appreciate your making yourself available. Your leadership in your previous role with Kaplan inspired us here in Singapore and around the globe to get into measurement of learning a lot more and consider fit for purpose, outcomes-based approaches from a teaching point of view, but I think it is fair to say that you are also a lifelong learner… Could you share a bit with us about your own learning journey with some of the world's most famous tertiary institutions like Oxford, Harvard and MIT?

Figure 1: Dr Bror Saxberg (Corcoran, 2017).

Dr. Saxberg: It's an odd journey, I started life as a research person. I used to do human and machine vision research at MIT's Artificial Intelligence Laboratory. That was back in the day when I was going between Harvard Medical School and MIT, because I was interested in how the brain processes and stores information and I was planning a good research career based on that.

After I finished my MD and PhD, I realised that the best labs were run by people who knew how to put together equipment, ideas, resources, funds and get them all to go in the same direction (laughs). And while poor labs were chaos, good labs had people who knew how to do this. Nobody was teaching graduate students or even young faculty members how to do that and I certainly wasn't going back to school after spending so long in school already. So I hunted around to see where I could learn this: I ended up at McKinsey and Company where I spent five years in New York. I figured those guys went in and solved problems like these for businesses all the time so what better place to try to pick up how to do this well?

A funny thing happened on my way through McKinsey because I really got interested in action at scale: by applying systematic approaches, thinking about organisational change issues and more you could make a difference in the real world. So when I finished my time at McKinsey in the mid '90's, I decided to jump into the middle of an edtech boom of that era, the CD-ROM revolution, to see if I could combine my technical capabilities with impact at scale. I managed to find a role as General Manager for a company called Dorling Kindersley, running their US Multimedia division. Ever since then, I've been on a series of assignments that are at the intersection of cognitive science, curriculum, assessment, instruction, technology, always at scale, always facing many users, not just a research setting. I continued that all the way through until I was lucky enough to work with you all at Kaplan for quite a few years.

So I started as a research person and turned into what I now think of as a 'learning engineering' person in terms of building things at scale.

Eds.: So did I sense that there was some frustration with the limits of the research part in terms of outcomes or application that the engineering part seemed to satisfy?

Dr Saxberg: I think it was less a sense of frustration with the research, but more an excitement about impact. In other words, I didn't get less interested in the research side, but rather the ability to affect 10,000, 100,000 or a million learners or more (like we're trying to do at the Chan Zuckerberg Initiative) was pretty exciting and was more motivating to me. It didn't reduce my interest in research: I was really engaged by the question of how best to apply research results at scale.

I'd started life as an Engineer anyway: my undergraduate life in Seattle was as an electrical engineering person as well as a math person, so I've always been interested in building. My research life was indeed pure research, but my time at McKinsey brought me back to thinking that building and having an impact out in the real world directly on lots of learners, like Kaplan does, was more attuned to my interests, so I made the shift.

Eds.: Wonderful. Our Journal of Applied Learning & Teaching that has only had one volume, has already managed to produce its own sub-themes of sorts and one of those is the lifelong learner, which is why we're so interested in your own learning journey because we all know teachers aren't always the best learners but you buck the trend…

Dr Saxberg: … One thing I would say is that my whole journey has been a change journey just like for you all. Being enmeshed in technology, you can't help but be changing what you're doing and having to come up with new ideas and new ways of making use of that changing technology. So it wasn't hard to keep changing and learning because there was no choice really (Eds. laugh). You know the CD-ROMs of the mid 1990's are gone and you know the capabilities of computers have moved on, what is it, a thousand fold? So if you're going to be doing this kind of work, the technology-enhanced work, you just have to accept you will keep learning and changing and that's not going to slow down. You're completely right about lifelong learning!

2. Promises and pitfalls of e-learning and m-learning

Eds.: We were chatting before the interview about some of the recommendations you'd made as Chief Learning Officer of the Kaplan group about reading in this vein for our own learning, including Clark and Mayer's E-learning and the Science of Instruction. In the third edition of 2011, the authors make the point themselves that digital technology continues to evolve rapidly. What would you say are the promises and pitfalls of e-learning and perhaps also learning today compared to when the book came out seven years ago?

Dr. Saxberg: Well, there is a new edition of this great work from 2016, if you're interested; they've been updating it every two or three years, so you'll need to order another copy. Sorry about that (Eds. laugh)!

There are a few things that continue to be terrific about the e-learning world and mobile learning which hinge on the flexibility of those tools, and the ability to engage interactively with a wide variety of learners in many ways. It's not just video watching and multiple choice question answering – there are new environments such as simulations and virtual reality spaces that create a broader set of experiences.

I think one of the risks of e-learning can be isolation: if you don't consciously address it, then the way you might be learning is only on your own – that's not enough anymore. Getting this right is a work in progress: how do you get important working-in-team experiences coupled with the e-learning and mobile learning work?

More generally, not just about technology-enhanced learning, I think we've been undercooking all kinds of non-academic learning issues. One of my colleagues at CZI, Brook Stafford-Brizard talks about comprehensive student development. In addition to academic or workplace task development, you need to think about developing other aspects, things like a learner's own identity development. What do the learners think about who they are and what they can actually learn? If a person is running around with an identity that says 'I can't do math', they're going to be very different in a learning context or around the workplace than if they're neutral on the topic, or thinking 'Yeah, I'm a math-using human being. I use Math all the time.'

Issues around what identity a learner needs to develop, and what toxic elements of other current identities they might currently bring in are not things we usually think much about when we design training and learning experiences. Similarly, other non-academic, non-work-task aspects get short shrift, including social and emotional learning – the capacity to talk to other people, work with them, understand their and your emotions, seeing a problem from somebody else's perspective. These are important skills for the future. Arguably, these are the skills that are the least likely to be automated over the long haul.

"Non-academic, non-work-task aspects get short shrift, including social and emotional learning – the capacity to talk to other people, work with them, understand their and your emotions, seeing a problem from somebody else's perspective. These are important skills for the future. Arguably, these are the skills that are the least likely to be automated over the long haul."

The sorts of cognitive and information processing and even mechanical skills that people have historically distinguished themselves by are ones that are increasingly able to be done by robots or other kinds of 'intelligent' appliances.

The good news is this makes it less likely people will be swotting tables of numbers and procedural work with pencils or calculators: the machines are pretty good at that stuff. But other issues will then require expertise: how do you explain a best solution to somebody else, how do you help somebody think through trade-offs for a solution that will work best for them, how do you think about somebody's life stage and current misery or joy and family situation – all are the kinds of skills that are going to last a long time as valuable skills for human beings to do with each other. I don't think we have enough progress yet with any technology to replace these, so we need a more explicit focus on making sure these very essential human skills get built out while we also work on whatever the current workplace skills evolve to, guided by information-rich appliances.

I do think technology has the possibility of giving even more possibilities for interesting training. Things like natural language processing of human voice recordings may help with some rehearsals and role play. Rather than having it expensively reviewed by a human expert, you may be able to get some initial feedback with an IBM Watson-like artificially intelligent agent, maybe not the best feedback, but some feedback quickly to at least get you started on improving as a learner.

Mobile devices are great, too, but phones have very limited screen size. This may be a problem for some instructional approaches, because some outcomes require the use of a full visual field, e.g., to lower cognitive load for a novice by providing more structure and information around the visual field. The tiny screen doesn't help as much on that front, but there are other terrific uses – the trick is to fit the learning purpose with the different technologies you have available.

Eds.: Yes, we're doing that at the moment for this interview, in fact. We have our questions on the right of the screen and then we have the live video recording of you and various other sources to guide us…

Dr Saxberg: Yes, and if you were trying to do this on an iPhone, not so easy, right?

Mobile can be fabulous, allowing learners to take advantage of times and locations for learning that pop up in their lives somewhat unexpectedly. We have to make sure that we are matching what's good about a technology to the kind of learning that we put through it instead of trying to force-fit all learning through any device even if it won't really work. The fact that you can work on a mobile device while you're waiting for a bus or when you're on the train or someplace else is great, but we have to design carefully for that brief moment with the limited visuals of those devices. The answer to 'Is now the moment to take a good look at that big art history textbook page?' might well be 'No', because you can't see anything of the big picture, you can see just the nose on a Picasso on your iPhone in sufficient detail, or a vague view of the whole painting, but you have no real sense of what the Picasso looks like. Not a good way to use mobile technology, so use the time and device differently. The trick is to match the technology with the learning event that gets you the outcomes that you're after.

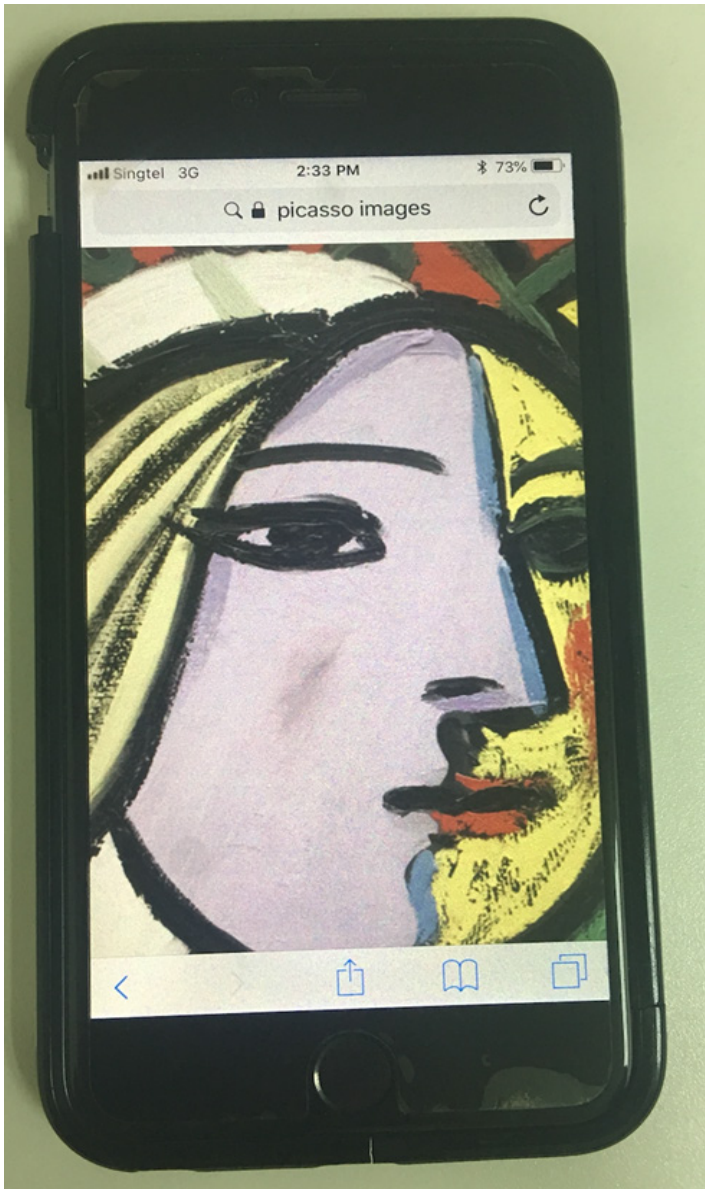

Figure 2: Looking at the nose of Picasso's Woman Before A Mirror on an iPhone.

"The trick is to match the technology with the learning event that gets you the outcomes that you're after."

Eds.: So if I may summarise, designers of the future and instructors should be thinking about: how do we incorporate the concept of team into this, the social, emotional and empathic approaches that are essentially human things that are hard to replace.

3. Metacognitive knowing about learning and a longitudinal approach toward mastery

Dr. Saxberg: Yes, this is right. However, one other thing I have to add to any description of what designers, purchasers, administrators, and of course teachers need to be able to decide and do about learning materials is to understand more of the empirical evidence about how learning actually works. That allows us to design, purchase, and train for what we know about the limitations and capabilities of learning from evidence we have, rather than how we wish learning worked.

"What teachers need to be able to decide and do about learning materials is to understand more of the empirical evidence about how learning actually works."

There is far too much learning designed for how we wished learning worked: if we listened to a great video from a fabulous lecturer, wouldn't it be great if that was enough to build expertise? Unfortunately, it doesn't work for almost all learners: if you don't engage in pretty detailed practice and feedback about a skill, most people won't acquire it. It's inconvenient that we can't just run a tape in front of people and have them gain skills, but that is the nature of human learning.

To get there, we need designers as well as teachers deeply understanding concepts like those in that *E-learning and the Science of Instruction* book you cited. Even if the evidence is frustrating, they should take it into account as they try to make the right trade-offs for learning. Designing learning, or anything else, is all about trade-offs and it is better to make evidence-based trade-offs than guess-based trade-offs.

Eds.: Yes, I was validating some lecturers for teaching roles the other day and you still get that problem of them never using evidence to check their gut reaction. There's a lot of assumptions about what their learners have learned. I would ask them how they knew that the learners in their class had achieved the outcomes the lecturer had planned. They would say 'I saw their body language was very positive', but no way of checking and assessing this objectively.

Dr Saxberg: Yep! They were not trying to gather real evidence of a mastery change – it is hard to do, but key. I suppose another piece of evidence that is hard to collect but should get easier as time goes on, is longitudinal evidence for mastery. It shouldn't just be the quiz at the end of a lesson and the assumption on the part of the faculty that, 'well my job here is done because most of the students got a high mark on this quiz.' In theory, we're not only trying to get people to get high marks on current quizzes, we're trying to get them to master complex cognitive skills for real-world use over time. So another really valuable skill for designers is to ask: "What's coming next that makes use of that skill that we intended this person to master?" and then go look and see if the earlier mastery is evidenced in that later exercise.

Writing is a good example of this. The essay practice you did in English class turned out 'great' and so now the theory is you've learned to write. How about that later history paper? Is it inadequately written? If a later piece of work that should be advanced by an earlier piece of mastery doesn't show that earlier mastery, then something is wrong.

An inconvenient truth about mastery is that you need to practice the transfer of it to a new environment; you can't

just write one good essay in an English course and say we're done mastering writing. You have to do several, and keep pointing to the general principles that you're using, to improve your writing. This will raise the odds that when you're in another new environment you'll be able to apply the principles in that new environment, too. It's a bit humbling

> "An inconvenient truth about mastery is that you need to practice the transfer of it to a new environment; you can't just write one good essay in an English course and say we're done mastering writing."

but it is a really important part of being a designer that as we start to have better and better data systems capturing longitudinal information, we should look two years out to see how kids did on the written assignments against the same rubric that we assessed them on back at the start. Can we see that they're still writing in the way that we intended them to write? Or do we have to fix something because every time they write a lab report in Science they are terrible; we got it working in history, but why aren't they writing well in Science? This kind of longitudinal investigation allows you to realise you've got to go back and revise your early instruction in the writing course to make sure it generalises better. Sorry, long answer to a short question!

Eds.: Not at all, and I was just thinking about the Professor that always likes to teach both first and final year because they want to see what has stuck. What was sticky?

Dr Saxberg: That's a great attitude! I think it's rare among Professors to have a clue about long-term outcomes of their learners from early, large courses – quite hard for them. Hard enough to recognise the students!

Eds.: Well that always depends on the number of students. We often teach 400 in the semester, not at the same time, of course and we spend half of the time remembering half of names. The frustrating thing is actually in the beginning we only recall a few names and then by the last class we know most, but then we don't see them for a while and we've forgotten them all. Perhaps we should take your advice and do longitudinal name recognition?

Dr. Saxberg: Maybe some spaced recognition work? You know, Ebbinghaus' research from the late 19th century: some great things to do, to memorise names!

4. The 'undead' lecture as an enabler for 'learning tourism' and the importance of practice

Eds.: Absolutely. I think you've already touched a little on our next question, which is regarding your views of the lecture. Do you agree with Salman Khan, who provocatively claimed that YouTubeU beats YouSnoozeU? And, of course TED Talks have almost revitalised the public lecture. If someone like us approached you and asked how can we make our classes more interactive, what would be your advice?

Figure 3: Hermann Ebbinghaus (1850 - 1909; Brittanica, n.d.).

Dr. Saxberg: There's a couple of things here. I think lectures have an important place. They are terrific at setting a context, at demonstrating why a topic or an area has real value; they can be motivating to show that learners can succeed at achieving complex tasks by telling stories and showing examples.

However, there is an inconvenient truth: when you're working on complex cognitive skills you really have to have students dig in and produce something. Learners have to use the principles, use the techniques. It is never enough for complex cognitive work to just listen. You do not end up reliably being able to perform, and things get forgotten, if you're only listening.

This doesn't mean you have to blow up the lecture hall. Given your environment you can find something better matched to how learning works. There has been work done by a physicist at Harvard, Eric Mazur, who sorted out how to turn a 300-person Physics class into a pretty engaging, flipped environment by focusing on problem solving during class. He had students do problems, and added one piece of technology, a clicker system for students to declare their answers, which nowadays you can do with cell phones. He could then see what fraction of students got things right: if most students did, he would move on. If many got it wrong, students were directed to discuss with their neighbour for a few minutes, and then re-enter their own answer. Again, if everybody got it right, he moved on. If most students were still getting it wrong, he would stop and discuss with the whole class. He had sorted out personalised instruction to an entire lecture hall of students!

Figure 4: Eric Mazur with students in a Harvard University physics class (Chase, 2006).

People have tried this successfully with even simpler technology, such as coloured paddles for answers. It can be very simple but it changes the classroom and the allocation of time from just lecturing to spending most of the time on the things that the group are finding the most confusing. And, of course, once you have technology available in the after-lecture settings, you can set some adaptive individual work, via simulations or many other. But lectures are far from gone.

There's another very important role for the more traditional discursive lecture: to provide chances for 'learning tourism'. Such lectures can be fascinating, interesting, engaging things just by themselves. (TED talks are absolutely that.) Sometimes they do make you go off and learn more, but often you just had a great time, and the experience was so mind-bending that it makes you think about the world for 20 minutes in a new way. There is nothing wrong with this 'learning tourism', as long as you aren't confused into thinking a 20-minute talk about string theory has made you a string theory physicist!

Eds.: I think it's the same with MOOCs, the beauty of the MOOC is you can just go in for a couple of minutes and then you hate it and you didn't spend any money and you checked out. We agree: 'learning tourism' has a place.

5. Teaching and career-counseling in a world changing at breakneck speed

Dr Saxberg: Another example of a use for a long-form presentation could be for something like career counselling. It would be great to have a walk through or a day in the life of a person in a role, ideally narrated, to help folks with no idea about careers find out if this is an interesting day. I may not (yet) be trying to become a Nurse, but I want to find out what it is like to be Nurse. That seems a great use of narrative and storytelling with a longer form, lecture-like or video-like. From there, I can check if I am now interested enough to do that for real, having had a sense of it.

I don't think we do this systematically enough for students in our career guidance, especially for High School and even College students. Often, it's only a random great teacher that happens to inspire you into becoming a chemist instead of a historian and that's no way to run a railroad! What if you would have been a really great historian instead of an average chemist? Maybe you would have really loved history, but you never had a great history teacher, nor any exposure to what professional historians actually do (very different from what students learning history typically experience). We need to figure out a more systematic way of exposing people to what it is like to be an X now?

Another career misconception example: car repair. Many in my generation think car repair is metal bashing: welding torches and crank shafts and oil everywhere, right? However, if you actually go into a modern car repair place, it looks more like a computer science lab. An awful lot of the work is actually driven by software, even AI, and I imagine robots will do a lot of the messy hard work in the future, leaving mechanics with clean hands, as opposed to thinking 'Ah it's all about the big pipe wrench banging away at the distributor cap. This'll do it! Always did it for my Grandpa; I bet it'll work for you too.' That will soon not be happening anymore.

Careers in general are no longer so fixed. Because of information-rich tools, jobs are going to start changing at the rate of Moore's Law (the exponential rate at which silicon chips advance their processing speed). What a nurse does today is very different than it was 20 years ago because of the tools available, and the repeated flow of information through systems, not just people.

Eds.: Yes, my wife and I had our third child last year after a six-year gap to the second child and what struck my wife was that when the midwives and nurses came into the room they went straight to the computer, but when she had our other children they went straight to her.

Dr Saxberg: Mmmmm, tricky: are we saying we've made progress with this? I'm not always sure. To your point, though, the notion of what it is to be a nurse is changing. Faculty run the risk of remembering a hospital ten years ago and won't have an awareness of what it's like now. We need more clarity on job needs that get revised as jobs change. Being a neurosurgeon is completely different in the age of robotics than in the days of heroic individual work in the 1970's and 1980's. A little scary, the stuff people were doing back in the day. . . good thing to have steady hands back in the day. Whereas now, we have MRI scans, we simulated the surgery six times, we have a robot set up to move slowly and carefully along a very tightly prescribed path. So, arguably, it's a totally different profession than it was. We need ways to retrain current practitioners, and to communicate to those who might be interested in these careers, to update folks to modern best practices.

Eds.: It's actually quite vindicating to hear you say that because we've been working with a start-up from the UK called Thinksmart that is really a learning tool that works on presenting authentic moments in the life of various professions as case study problems and allows users to try and select the appropriate solutions. These moments are higher stakes than the everyday, maybe once a quarter or once a year kinds of situations. All of the solutions for

the cases are plausible but the 'correct' one is that agreed upon by a panel of experts. So to rephrase what you said earlier about being able to expose learners to a variety of experiences, this seems to have some clout.

Dr Saxberg: Yes, and if you start this exposure all the way back when kids are 12, which is when they're beginning to be civilised and can understand a lot of work-related stuff, you can show them a lot of different types of work. By the time they are 17 or 18, they could have easily been exposed to and experienced hundreds of types of work and begun to get a sense of what might be a fit, especially if you're using automated tools to record: 'What did you think? Can you see yourself as this? And what did you like, didn't like?' You could begin to provide a navigation system that would change as the kids changed from being 12 to being 17, and could help them hone in on things that their parents or friends or friends' families would never have had any idea would have been a match for that kid.

This happens all the time across the economic spectrum, that families can't help kids imagine a wide array of careers. It's not just the impoverished, difficult circumstance, where nobody knows what a developmental neurobiologist does. Even in a higher-end environment where 'everyone' is a doctor, lawyer, accountant, or other professional, nobody has any idea what great jobs there are, say in working with big machines. I had a friend whose family were all doctor-lawyer types. Their middle child wasn't doing very well at school - he liked to work with his hands. His family was distraught: 'What's he going to do? Is he just going to pump gas? What will we do with him?' The other children were all 'properly trained' lawyers and doctors.

That kid eventually found his way and became one of the world's best maintainers of machines with wheels that are six feet tall (two metres) or higher. So he's probably gone out to Western Australia a number of times during the boom days of mining, and all over the world, doing interesting and specialised maintenance and repair work on some of these incredibly expensive, giant machines. He makes a six-figure income, and by every measure the lad turned out to be successful. But his family had no idea early on that there were jobs out there of that kind, that could create satisfaction for a kid who was mechanically inclined. Nobody in their social circles were in any way mechanically inclined.

This makes for a really interesting puzzle, to give all levels of families a much wider exposure to careers that might fit their children, as their interests begin to become more visible.

Eds.: Well, you've given us a really interesting potential solution to our employability question. Let's start a bit earlier.

6. The rise of the machines and difficult-to-automate competencies

Dr Saxberg: There's a really important question to be answered: what are the long-lived skills for human beings, the things that are unlikely to be automated away near-term?

A Harvard Business School Professor, Amy Edmondson, and I wrote a piece last summer for the McKinsey Quarterly where we tried to look at the increasing value to corporations of becoming very good at changing skills. One of the parts of the article was about which skills will pass the test of time in the presence of increasingly capable information-rich tools. An Australian venture capitalist, Christopher Selth, had a nice way of thinking about this: the purpose of people, ultimately, is to give meaning to each other, to our lives, decisions, and struggles. The kinds of skills that allow me to give meaning to you are very hard to automate away. If you are in a community theatre company, and your audience is a set of robots who clap and cheer at your version of Hamlet…really? I'm feeling good about my performance when a bunch of robots clapped? Not so much… but when it's real people who are crying in the front row, now that's meaningful to me.

> "The kinds of skills that allow me to give meaning to you are very hard to automate away. If you are in a community theatre company, and your audience is a set of robots who clap and cheer at your version of Hamlet… really? …But when it's real people who are crying in the front row, now that's meaningful to me."

Or think about life stages. There's nothing like talking to another parent when you struggle with your own children: sharing the jetlag from the kids screaming at night, etc. As opposed to Siri on your iPhone saying "I'm really sorry to hear that. Would you like to listen to another song?": it's not going to do it for you. Another example from the business community that's been going on for decades is solution selling. For complex sales, the idea is that, instead of me trying to get you to do what I want, let me try to understand what you want to do, what will advance your career? Then I can figure out how what I am providing will help you reach your goal, not just mine.

Those kinds of skill and the communication that goes with them, we really should start in pre-school: "Why is little Bror again hitting little Juergen on the head with a truck"? (Eds. laugh.) One approach is for little Juergen to bash right back on little Bror. But another approach is for little Juergen to figure out 'What's going on with little Bror?' And maybe solve that problem instead.

We can teach kids to do that kind of thing, to think about a situation from the other side, and then find a solution. The more we start giving students in elementary school, middle school, and beyond ways to see the world through someone else's eyes, the more they have valuable skills to build on that are not going to be automated away, the better their future.

Eds.: Right, so you gave us some answers to the question asked about the long-lived skills for human beings, but on the subject of your article with Edmondson, you were

saying that there's increasing value for companies who are able to keep changing skills of their associates. Can you say a bit more about that in relation to the education ecosystem?

7. Creating top performers and maximising corporate potential via evidence-based training programmes

Dr Saxberg: This is one of the reasons why the corporate training part of Kaplan always intrigued me. I am increasingly convinced that there are trillions of dollars of corporate value trapped behind walls of inept corporate training caused by companies not understanding what makes top performers different from medium performers. As a result, they do not design their training to measurably move medium performers closer to top performers, leaving huge amounts of value on the table.

Companies can see (i.e. measure) the variance between median performers and top performers: sales people, project managers, nurses – pick whatever job you want. Top performers differ from median performers in how they add revenue, reduce error rates, reduce other costs, increase the lifetime value of customers, on and on. Because of Moore's Law mentioned earlier, information-rich tools are changing faster and faster which causes careers (and top performer decisions) to change faster and faster too. This means that the huge lake of trapped corporate value caused by the inability to move median performers towards top performance is getting deeper faster and faster.

It might take 20 years or half a century, but eventually there will be holes put in that multi-trillion-dollar wall (that is trapping the corporate value). Once there are enough examples of this kind of work (training and development people lifting, e.g., a $90 billion dollar valuation company by $15 billion, by spending $100 million on evidence-based cognitive task analysis of top performers with evidence-based learning design) and enough examples of CEO's who have made their bones on the basis of skill changes to their organisations, there will be a wash of other leaders at all levels that want to unlock their piece of the trillions of dollars of corporate value before their competitors do.

If they do this, imagine the kinds of questions these companies will then ask higher education! Because companies will now know how to train people to be top performers in a reliable, repeatable way, they will demand the same from graduates of higher education – they should be ready to be top performers in their field when hired.
There's a decent chance many in higher ed will say 'Naaaa, we're not going to do that because we've been doing what we do for centuries so why would we listen to you?' I think corporations will then say: 'We do know how to do this - we're going to hire high school kids and train them in the same way that we know how to train our other employees,' and sideswipe parts of the higher education system that don't change.

Imagine it: trillions of dollars of missed value to corporations are going to push upstream to change or replace higher education because corporations will take the stance that they can hire high school kids or first year kids out of college who know a little bit and put them in evidence-based training programs. Why should they hire a badly trained nurse from a university and try to retrain them, when it is more efficient to train them correctly with evidence-based methods to deliver top performance from the beginning? Since each employee, through information-rich tools, delivers ever more value with the best decisions compared to mediocre decision, this will pay off with increasing value over time.

If there's trillions at stake, the money will flow and people will figure out how to be rewarded for doing this better and better. My view is I'd rather get ahead of the raw economics, not wait many decades for this to happen on its own, but I see the economic pressure forcing this to happen no matter what. This is all a little cosmic gentlemen, but I'm just saying…

Eds.: Oh no, not at all. Actually, I would like to follow up a little bit on this because I think the three of us, we are great believers in education and, I still think, in higher education, although these are excellent questions that you're asking and, of course, evidence is extremely important. You're probably familiar with Martin Ford and his books, The Lights in the Tunnel and The Rise of the Robots and I think he's making some very eloquent and fair points that he's really very concerned about the future of work and that, basically in the next couple of decades, lots of people may lose their jobs and there may be underemployment, and also education may not be the panacea anymore, so he even considers something like a basic income that is paid to every citizen and so on. But I'd like to read a quote to you from another book, Home Deus…

Dr Saxberg: Yes I know that book.

Eds.: We were confident you would (all laugh).

Dr Saxberg: No, no, you just happened to pick things I've read!

8. The paradox of knowledge: our ignorance increases with more knowledge

Eds.: So, let me read this about the paradox of knowledge, which I found completely mind-blowing and that is something that I'm meditating on a little bit at the moment:

"Knowledge that does not change behaviour is useless. But knowledge that changes behaviour quickly loses its relevance. The more data we have and the better we understand history, the faster history alters its course and the faster our knowledge becomes outdated… Today our knowledge is increasing at breakneck speed, and theoretically we should understand the world better and better" (Harari, 2016, 58-59).

But actually when you compare 1,000 years ago in Europe and today, for instance, if you compared 1,016 AD, it was relatively easy to predict how Europe would look at in 1,050 AD, there would have been little difference, but in contrast we have no idea how Europe will look in 2050 (Harari, 2016). So what Harari is saying is, because we are

so knowledgeable, because things are moving faster and faster, paradoxically, we really don't know what's going to happen or, to use the four types of knowledge, we don't know that we don't know.

Dr Saxberg: It is a conundrum. I think, as we have always done, we in part will use technology to try to guide us and aid us and accelerate our understanding. There is a real puzzle here. When the economics of machine-driven work pushed humans to transition away from doing most of the physical work, there was a place for people to go to add value: if you could figure out how to get more and more people to do intellectual work, creative work, information-based decision-making at scale, then people added additional value. Their new work then leveraged all the machines that did the physical.

I still think there's a lot of room for human work, creativity and thinking even if implementation and complex information processing is increasingly carried out by various kinds of machines. Some of the folks who write about this paint a depressing picture of humanity split between an elite class with everybody else as drones. I just don't buy it.

"I still think there's a lot of room for human work, creativity and thinking even if implementation and complex information processing is increasingly carried out by various kinds of machines. Some of the folks who write about this paint a depressing picture of humanity split between an elite class with everybody else as drones. I just don't buy it."

If you look at the changing nature of work and how people work together, how they draw on each other through gig economies and so forth, there's all kinds of new structures of human work that technology is enabling. As I said earlier, the critical capacity of people to give meaning to each other is going to remain valuable, even at a point where everyone is supported by robots, growing food and so forth.

It may take generations, and there may be serious dislocations along the way – not saying it's necessarily a smooth ride. People have been surprisingly resilient generation after generation at finding new sets of things to add value to. The number of new professions that have sprung up after years of technology already changing work is extraordinary.

9. Multi-skilling or the 10,000-rule multiplied

Here's another example of a path forward for people which is very dependent on better learning. When we talk about obsolescence, what we often focus on is one skillset "Oh my, being a tax lawyer in the US servicing middle income clients, you're in trouble." Your job is first outsourced to India, and then outsourced to IBM Watson.

What people forget is there's another way to think about adding value. One of the things learning science suggests is, with well-designed instructional environments, you can gain world class skills in about 10 years of half-time deliberate effort. This is the "10,000 hours" idea that you see in Malcolm Gladwell's work, or the original Anders Ericsson work. (It's half time for 10 years because doing this well is quite exhausting. Many careers show the same thing, it takes 10 years to be a fully licensed architect, lawyer, doctor, plumber, etc.)

If we're all living to be 90 and you start building competence when you're 20, you have 70 years to build world-class competence. So let's do the combinatorics: Imagine there are 1,000 different areas you can become world-class at and you pick one at age 20. 10 years later you pick a second one. 10 years later you pick a third one, 10 years later a fourth. Now do the math: 1,000 choices for the first, 1,000 for the second, 1,000 for the third, 1,000 for the fourth – you end up with a potential trillion different combinations of four different world class competencies to choose from! Not all are necessary – but that's a lot of possibilities – and more when you add the fifth and sixth decade!

Thought experiment: you start life as a gardener. Then you get a business qualification so you can run a great gardening business. Then you get a robotics qualification – you are preparing to be the world's first robotic gardening service. In fact, you probably need a law degree – those early robots are going to hurt some people, eh? By then, there won't be many human beings on the planet who are exactly right to build the world's first robot gardening empire, with world-class competence in gardening, business, robotics, and liability law! Four world-class competencies bouncing around inside one human head!

"There won't be many human beings on the planet who are exactly right to build the world's first robot gardening empire, with world-class competence in gardening, business, robotics, and liability law! Four world-class competencies bouncing around inside one human head!"

That is a possible source of human value for the long haul. It wouldn't help to have four different expert systems, one for each area: you need to blend all these together in a creative way to try to build something new. You have the expertise in one head to make you quite unique on the planet. Combinations of world-class expertise can also allow humans to retain uniqueness and value over specialised, individual machines.

However, note that this requires we have highly reliable and effective skill-change systems, so when someone decides "I'm going to become a world-class roboticist," there's a place for him or her to go and a set of activities to give him or her the practice and feedback needed to reliably hit this goal. With machines doing a lot of underlying work to keep

bread on the table, we have time to do this – but we do need reliable systems for training that are tied to world-class expertise and evidence-based instruction to make this work.

No pressure on our education and training systems, but the fate of all humanity may hang in the balance. . . Uh oh, I've gone cosmic again, sorry. . .

Eds.: Yes so we know the one true competence is change, but how can educators embed that because so much of what we do is so planned and structured with soft landings and hard testing? How can we prepare the mindset that would know that every ten years I need to reskill?

> "The classic question we ask kids is 'What do you want to be when you grow up?' Now we should be asking, 'What things do you want to be when you grow up?' We want most kids to say many things, not just one."

Dr Saxberg: Well, a flippant, but maybe relevant answer, is to start very early. The classic question we ask kids is 'What do you want to be when you grow up?' Now we should be asking, 'What things do you want to be when you grow up?' We want most kids to say many things, not just one.
Maybe a little person wants to be a Princess and then a Neuroscientist. Well, fabulous, there's nobody better on the planet to be working on people's beautiful smoothness of face then a Princess Neuroscientist! Kidding, of course – a real Princess Neuroscientist would be working to bring the benefits of improved executive function to all her people. . . Seriously, though, instead of a dread focus on 'What's your career out of college?' we need learners to start imagining a sequence of careers and training, and plot out what order makes sense.

We've got to think about human development as a multi-dimensional trajectory where we work on changing people's identities at the same time as we're changing their skills. A key identity change is that we're supposed to have more than one expertise in life.

This is a real change. I don't know if it's true in Singapore, but in the United States, there are a lot of people with real, single domain expertise from decades past that can't get a job using this expertise now. Their identity is that they are an expert – unfair that their single expertise is no longer enough. We have to change that identity to embrace the ideas of continuous change within their expertise, and the need to add more expertise categories.

10. Key teaching strategies for a personalised learning approach and promises of neuroscience

Eds.: We notice that your work at the Chan-Zuckerberg Initiative addresses primary and secondary education, as well as post-secondary through the College Board work and other initiatives. This is a big stretch! What are key

Figure 5: Mark Zuckerberg (TV5 News, 2015).

teaching strategies for teachers to employ to enable a personalised learning approach? Do you find the quest for personalised learning in one of these arenas at all at odds with a standardised testing focus of the other; where do these concepts intersect?

Dr. Saxberg: The nice thing about learning science, at least as much as I've been able to understand, is that minds keep working pretty much the same way once you're in middle school and beyond. It is true that for the smallest folks in elementary school and earlier, there are some different things you have to pay attention to, different affordances you can take advantage of (like real respect for what parents pay attention to – that tends to fade in middle school and beyond. . .), much like the distinction between paediatrics and general medicine: some things work the same, some things are quite different.

In all cases, though, it is really important to pay attention to the differences minds have at the point where they are engaging in instruction for the same learning outcome. Two different students, looking at a white board on which is written "ax^2 + bx + c = 0" may have two very different reactions. One student thinks, 'Oh, no, this is a quadratic equation – I know she's going to ask me to factor this to find the roots. I hate factoring quadratic equations!' Another student thinks, 'Why are there letters and numbers on the same line?'

They are having identical sensory experiences, but completely different cognitive (and emotional) experiences: the first student's long term memory has immediately "chunked" the information on the white board (probably as the teacher is writing it) to recognise "quadratic equation" – and, from prior experience, has a negative reaction to it. The second student has no prior instruction on polynomials, or possibly even the use of letters to represent variables (a quite difficult concept for learners, it turns out), but also has no particular emotional/identity reaction, either – just confusion, maybe curiosity.

So we need to support teachers and learners in identifying what, exactly, learners have in long-term memory – both cognitive issues, and identity/emotional reactions – and how best to handle the very different needs for these minds. The question of what our actual long-term targets are is different, and key, to this. I would argue that we have to

become better at pulling backwards from current decisions of top-performers at work to what is needed to get ready to learn this. Years ago, when I started in engineering, a crucial skill was claimed to be working a slide rule. Educators persisted in training us on fluency in slide-rule use even as scientific calculators clearly made those skills obsolete – it was 'what we do'. A waste of time, for future top-performance – yet hours were spent on it!

Same with standardised tests: 1) we need to evolve our evidence-gathering across students to more quickly keep up with key performances that lead, ultimately, to high performance in many fields, as those requirements change, and 2) if the 'standardised tests' do not evolve, we are going to have to sort out how to prepare our students to 'get over them', where they remain mandarin-like obstacles to further training, without missing the preparation required for actual top-performance in the future, even if not reflected in 'standardised tests'. Very messy, possibly very inefficient – but if the real world requires it, we must help students do both well.

Eds.: What are the latest happenings in the neurosciences that are getting your dopamine levels rising?

Dr. Saxberg: A very tough question – I suspect I am not as up-to-date on deep neuroscience questions as I should be, so your readers should realise I'm not the ideal guide here! (And if any of your readers are neuroscientists, have them contact me if there's anything that excites them about practical implications of the neurosciences they've seen!)

I'll start with some hesitations. Neuroscience is a broad field, with many branches. Quite a few of these have been working for years on really fundamental mechanisms of learning – how do cells communicate? How do various brain structures connect cells together, and learn? Much of this, while promising for the future, does not directly suggest how to practically improve learning, e.g., for algebra instruction for 13-year olds.

That's okay – it's very reminiscent of what happened in medicine in the 1960's, when DNA became first recognised as fundamental to human development and disorders. For a long time, the basic research created explanations for what clinicians were seeing: various disorders, like Huntington's Chorea, were determined to be defects in very specific parts of a person's genome. From a science standpoint, fascinating – but from a clinician's standpoint, nothing new to do at the time.

Eventually, however, work on genetics, DNA, RNA, protein synthesis and more led to new treatments that prior biology would never have suggested. Huge benefits followed – and we continue to explore all that for human health. In the same way, I feel that a lot of neuroscience is very early stage – and may explain some of what we already know from cognitive science, as well as issues in development, e.g., the impact of toxic stress on cortisol levels that create biologically-based learning difficulties. There's still a paucity of results from neuroscience itself about what to do, in a school, at scale, to help – but this will come.

One fascinating area that I see on the cusp (in addition to paying much more attention to lowering toxic stress levels in communities and families) is work on what is called executive function: things like people's working memory, their ability to focus and resist distractions. There are very intriguing correlations between these lower-level capabilities and learning and life success, but a lot less clear causal connections between what you might do to lift these lower level capabilities (as measured currently) and gaining learning/life benefits. If we can start to show learning and life benefits for various interventions on executive function itself that are scalable (specific practice and feedback regimes using adaptive technology, perhaps), this could be very exciting. There is intriguing evidence about this for kids with ADHD (including late-stage FDA trials going on now in the US) and for seniors with dementia – just nothing (that I'm aware of) very convincing for normal folks.

We shall see – we are reaching an exciting period where our understanding of biological, neural and brain function is beginning to overlap with our understanding of cognitive progress in learning, emotional regulation, and identity. Fingers crossed – could be great new things to come, if we are careful to use good evidence, personalise our interventions to what individual learners have already experienced and mastered, and pay attention to what careers really need going forward.

Eds.: Dear Bror, thank you so much for the fabulous interview!

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Capitulation, occupation, incarceration, regeneration, education: How Singapore has rediscovered its World War 2 legacy

Nigel Starck

Independent Member, Academic Board, Kaplan Higher Education Singapore

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Singapore experienced profound suffering in World War 2: bombing, invasion, occupation, interrogation, mass execution. After the war, accordingly, the public mood was not disposed towards overt reminders of those years. The concentration was on creating economic and social revival – war memorial sites had little part in that. Today, though, a mood of regeneration is apparent; sites of significance in that wartime experience have been refurbished, and are now advertised as places of significance to tourists interested in military history. In unison, they proclaim Santayana's assertion that 'those who do not learn from history are doomed to repeat it' (Santayana, 2018).

At each of those locations – four of which are examined for this journal – the trauma of conflict is readily apparent. Come February 1942, the Allied forces had endured 70 days of brutal conflict, right down the Malay peninsula and latterly in the bombardment of Singapore itself. Morale was briefly massaged by a lingering belief that Singapore was indeed – as had been bruited abroad – an impregnable fortress. It all came to abject surrender.

The Japanese had seized control of the water and oil supplies, and Lieutenant General Arthur Percival (General Officer commanding Malaya Command) was persuaded by his senior staff that surrender was inevitable. The act itself took place at the former Ford motor factory – seized and transformed for the moment into the Japanese HQ. On the evening of 15 February 1942 General Percival led the surrender cohort, with his interpreter, Major Cyril Wild, carrying the white flag. Wild quickly threw it down when he realised he was being filmed for the Japanese newsreels.

Indicative of the widespread post-war unwillingness to reflect or remember that humiliation was the decision in the 1960s to board up The Battlebox at Fort Canning, a steep hill rising above what is known as the colonial district. This bunker complex, where General Percival and his staff took the decision to surrender, had been abandoned and effectively buried. It would remain closed and unexplored for nearly 20 years. Then, in 1988, Romen Bose, a trainee journalist serving an internship at The Straits Times (Singapore's English-language morning newspaper), was shown a letter that changed his life and that of the Battlebox. The letter, from a former president of the Singapore History Association, described the existence of the bunker. Bose and a photographer followed the letter's directions and noticed a door with a padlock, set into some earthworks (Bose, 2005, p. 28).

The padlock looked rather feeble, so they gave it shake and it fell apart. In they went, finding within the bunker complex an abandoned motor scooter, the skeleton of an unfortunate dog, a penknife, a spanner, a pair of pliers, and cork boards that had probably once displayed charts. This was where Percival had taken the momentous decision; this was where, in microcosm, Singapore had subsequently chosen to forget. Bose wrote his story, publishing it on July 26, 1988. The Singapore authorities recognised the tourism potential; come the 1990s, the place was cleaned up, tours were scheduled, and highly expensive animatronic figures were installed. They are clad in World War 2 uniforms, their facial characteristics modelled to match those of the senior officers who decided that surrender was unavoidable.

Figure 1: Battlebox Exterior. The Battlebox at Fort Canning: sealed up for 20 years, now a major tourism location.

General Percival and his staff had occupied 29 rooms, nine metres below the surface, without air-conditioning. The temperature therefore had to be fixed for tourists, along with lighting and cleaning, construction of a newsreel booth, the models installed, and (inevitably) a souvenir shop. It reopened on 15 February 1997, exactly 55 years after the surrender. I paid my modest $5 entry fee in April that same year.

The immediate experience back then, while most informative, had one major flaw. The animatronic figures' movements were accompanied by dialogue, with a script that could with reason be described as wooden and voiced by actors who would have failed auditions for Australia's Wagga Wagga amateur dramatic society. In particular, the characterisation of Major General Gordon Bennett, commander of the Australian 8th Division, was shamefully off-key. He was portrayed as a Crocodile Dundee sound-alike. Elsewhere in the complex, the souvenir shop of 1997 contained some violent anti-Japanese images – notably in the postcards on sale. They depicted the invader as a devil figure, much in the manner of WW1 posters that depicted the Hun as the violator of Belgium.

In more recent times, the Battlebox underwent a three-year hiatus for cosmetic and aesthetic alterations. The National Parks Board awarded a new tour management contract to

Figure 2: Battlebox Surrender Decision (Percival). Inside the Battlebox bunker: lifesize models of General Percival (standing) and his staff.

a group calling itself Singapore History Consultants, which draws on the expertise of the history department at the National University of Singapore. These have been the shifts in emphasis:

- A much longer tour (by some 20 minutes so that it now lasts 80 minutes) – and, wisely, with those animatronic figures now rendered static and, blissfully (for sensitive Australian ears), mute.
- An extended screening of World War 2 newsreels.
- A more thorough, and in some ways more scholarly, assessment of factors that led to the surrender: the loss of water and fuel supplies to the Japanese; atrocities perpetrated on the civilian populace; hopelessly inadequate air power; and the pre-war notion that an attack down the Malay peninsula would be either impossible or easily repelled.
- A toning-down of memorabilia in the souvenir shop, with a greater emphasis on books by authors of repute.

Visitors are able to learn a great deal about the traumatic loss of the so-called impregnable fortress, through newsreel footage of the time and through the tour guide's detailed account. A popular urban myth is put to rest, too, in the literature available at The Battlebox (Bose, 2005, p. 62). It is often said that the gun emplacements protecting Singapore were rendered useless because they were facing south, out so sea, and could not be swivelled round. This is entirely untrue. The problem was in reality one of ordnance. They had been armed, for the most part, with armour-piercing shells rather than high-explosive shells. Consequently, they hit the ground with a mighty thud – but little effect. Rather than being easily repelled, therefore, the Japanese advanced remorselessly down the peninsula.

The invading force, though, did encounter some considerable resistance. This factor has inspired the creation of another tourism site, in this case on a hill overlooking Pasir Panjang on Singapore's southern coastline. 'C' Company of the 1st Battalion, the Malay Regiment, defended stoically and heroically – outnumbered and suffering heavy casualties, yet inflicting them too. Eventually it put up a last stand at a hill called Bukit Chandu (Malay for 'Opium Hill', named for the nearby opium factory). Today there is a permanent exhibition and memorial with daily tours at a restored colonial bungalow, operating under the title Reflections at Bukit Chandu. The final assault, visitors are told, led to desperate hand-to-hand fighting, with but a few survivors. In the Battle of Pasir Panjang Ridge, the Malay Regiment lost 159 men. The Japanese, infuriated by the events of Pasir Panjang, swept into the main military hospital, the Alexandra. On February 14, they bayoneted patients and staff, locked up others overnight, then paraded them outside and opened up the machine guns. Total fatalities, according to Singapore in World War II (National Heritage Board (2016: 19), were approximately 250.

That sort of treatment was directed at the local Malay and Chinese populace too. The accumulated effect of these atrocities, along with the loss of water and fuel supplies, was instrumental in Percival's acceptance that surrender was the only option. After that decision was taken at the Fort Canning Battlebox on the morning of the 15th, it was signed at the Ford motor factory, Bukit Timah – a location for yet another prominent feature in the regeneration of Singapore's wartime memories.

The Ford motor factory had opened in October 1941, only a few weeks before Japan's dramatic entry to the war; it was the first automotive assembly plant in south-east Asia. It would soon be making vehicles for the Japanese army, after briefly serving as headquarters for the invaders. After the war, it reverted to its old role until 1980, by which time Japanese motor manufacturing had achieved its own victory. Reopened as a museum in 2006, it has subsequently devoted its galleries to displaying what the years 1942 to 1945 meant for the civilian populace, under the permanent banner of Surviving the Japanese Occupation: War and Its Legacies.
Those immediate legacies in 1942 included internment and obeisance; the museum displays images of civilians bowing to the occupying forces. There are images also of the inevitable slaughter and torture, by bayonets directed even at infants and by slivers of steel probed under fingernails during interrogation by the Kempeitai, the Japanese internal security agency.

Figure 3: Ford Factory Surrender. February 15, 1942: General Percival (extreme right) arrives at the Japanese military headquarters, in the Ford motor factory, to sign the surrender. Major Cyril Wild (extreme left) carries a white flag.

The major centre of incarceration for the Armed Forces taken prisoner was Changi. According to The Changi Book, published by the University of New South Wales Press in collaboration with the Australian War Memorial (Grant, 2015, p. 16), its various barracks and the gaol itself over the war years held an accumulated total of 87,000 Allied prisoners; 850 of them died there. They were hungry, they were bored, and they were frequently abused on work parties for the Japanese war effort. It has become the most popular site of all for contemporary reflection, as demonstrated by the hundreds of messages left on its notice board by visitors with POW connections.

Figure 4: Chapel notes. The notice board at Changi chapel; visitors with a connection to former prisoners of war leave messages every day.

Until recently, there have been five guided tours a day of the Changi museum and replica chapel. (The original chapel was brought to Australia after the war and re-erected at the Royal Military College, Duntroon.) For the present, though, access is severely limited, as the entire site is being given a make-over as part of Singapore's war-themed tourism regeneration; it will re-open in 2020.

When teaching in Singapore, on behalf of an Australian university, I have often directed my students to enrich their knowledge by inspecting all these locations. Their educational value is immense, for those studying history and politics and (especially of late) creative endeavour in tourism. This form of directed study has appreciable legitimacy when considered as experiential learning –¬ and, in the instance of Singapore's initiatives, the combined force of such experiences is guaranteed to supply some enduring messages.

One such message is found – for the student, the tourist, and the reader of this journal ¬– in a poignant story of personal pain and loss at Bukit Chandu. It emerges in the paintings of Chia Chew Soo, a Chinese boy aged just 10 at the time of the Pasir Panjang battle. He was seized by the Japanese, his parents were bayoneted, his father died, and his mother died two months later (after giving birth). Chew Soo himself was bayoneted, and he captured this chapter of horror in watercolour. His paintings record that day in February 1942 when his village became a place of reprisal and slaughter.

Figure 5: Bukit Chandu Capture. Memories in watercolour: Chia Chew Soo's painting of what happened when his village was invaded in February 1942.

Figure 6: Civilian atrocities. A young artist's memory of civilian slayings, preserved in paint: acts such as these hastened the surrender.

As a veteran researcher in this field of scholarship, I was immediately reminded of a visit I made some years earlier to Dachau concentration camp, just outside Munich. There, one encounters the paintings of an unknown inmate whose artwork merges seamlessly, but disturbingly, with the monstrosities painted by Chew Soo. One can take a hilltop walk at Bukit Chandu today, reflect on the turbulence and trauma of times past, and in so doing one is immediately aware – especially when the Dachau experience is added to the story of Pasir Panjang – that in war the capacity for acts of atrocity has no bounds.

Figure 7: Dachau. Same war, same level of atrocity: Dachau concentration camp, outside Munich, mirrors what happened at Bukit Chandu.

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All photographs by the author

Synergy pod learning infrastructure – discover the joy of learning

Matt Glowatz

Assistant Professor & Academic Coordinator for International Students, Management Information Systems, University College Dublin

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Introduction

There has been much debate in Higher Education (HE) about the use of innovative technologies to enhance student learning. However, while technology alone may not have fundamentally changed teaching practices (Henderson, Selwyn & Aston, 2017), students report how several technologies and applications benefit their learning, research and collaborative activities (Henderson et al., 2017). Over the past 26 years, Kaplan and University College Dublin's (UCD) College of Business' Centre for Distance Learning (CDL) offer a wide range of undergraduate and postgraduate programmes to students in Singapore. Drawing upon a concise analysis of relevant literature and theoretical frameworks in the context of student learning and engagement, the author examines how Kaplan's state of the art collaborative learning environment, the Synergy Pods, can facilitate more effective and efficient student learning, assessment, feedback and engagement.

Students, Technology and Learning

Today's students entering third level education have grown up immersed in technology can be categorised as 'digital natives' or the 'net generation'. Having been exposed to technology throughout their lives, this new tech-savvy student cohort tends to be very comfortable with technology and, subsequently, expect from HE institutions to offer innovative technology-driven learning spaces. As outlined by Bennett and Maton (2010), debates on technology usage in higher education often highlight a need to radically reform teaching styles and approaches that might better meet the needs of the digital native student cohorts.

Most higher education institutions (HEIs) utilise learning technologies, such as virtual learning environments (VLE), however, one of the main challenges HEIs are facing is the need to design and implement a **holistic approach to modern education** incorporating the three essential components of education, namely "**knowing**", "**doing**" and "**being**" (Figure 1). The "knowing" part covers theoretical frameworks and knowledge, however, students are also required to apply theoretical knowledge into practice ("doing") while developing generic management skills, such as leadership and negotiation skills, ethical awareness and cultural competences ("being").

From a module assessment point of view, Evan's (2013) proposes an assessment framework accurately measuring **meaningful student learning** in the context of HE. The Evan's Assessment Tool (EAT) has been designed to implement **meaningful, actionable assessment strategies helping the learner to improve his/her overall learning experience** while completing a programme in HE. Unlike traditional full-time students, distance learning students

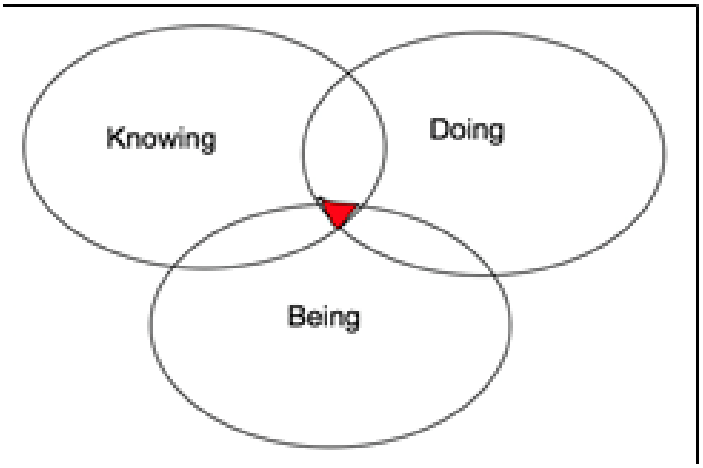

Figure 1: Components of Education

have different learning and assessment requirements due to the nature of not being based on campus, thus, not having the same access to lecturers as full-time students have.

Some research suggests that students are not actively calling for universities and faculty to dramatically increase their use of technology, however, prefer moderate use of technology in their courses to enhance their learning (Henderson et al., 2017).

While Henderson et al. (2017) suggest that 'digital technologies are now an integral aspect of the university student experience', their research findings point to a disparity between the rhetoric around the use of technology to enhance learning and the reality regarding students' use of technology.

Koehler and Mishra (2009) identify the **technological, pedagogical and content knowledge (TPACK)** framework exploring the relationship of technology, pedagogy and content knowledge required in teaching. The TPACK framework was introduced as a framework to allow teachers, academics, and researchers to conceptualise the knowledge base necessary to teach effectively with technology. The central elements of good teaching with technology according to TPACK include content, pedagogy and technology, and only the interplay between these three domains can generate the type of flexible knowledge which is needed to successfully incorporate technology into teaching.

In another relevant research article, Kolb and Kolb (2005) investigate foundational educational theories. Drawing on recent experiential learning theory, practice and research, the authors propose strategies of how **experiential learning** may improve student learning, student engagement, assessment strategies, curriculum development and faculty development in higher education.

Having studied above literature and theories in much detail, there was only ONE solution for the author to deliver his

UCD lectures and student orientation sessions at Kaplan: **"Discover the Joy of Learning" in the Synergy Pod**.

The Synergy Pod

Kaplan's Synergy Pod infrastructure setup allows the educator to implement an innovative curriculum design meeting the above discussed components of education while utilising innovative technologies and applications for teaching, learning, assessment and engagement in line with Koehler and Mishra's (2009) TPACK framework.

Additionally, the Synergy Pod allows for better student engagement, learning and assessment forcing students to move from being passive knowledge consumers to become active learners focussing on collaboration and "learning from each other" as outlined in Figure 2.

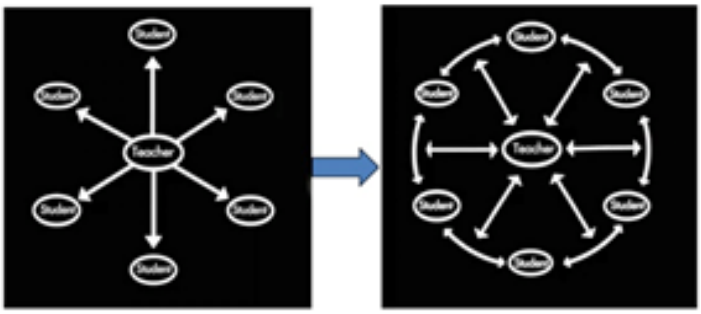

Figure 2: Traditional (left) and Collaborative (right) Learning

The author's personal experience using the Synergy Pod infrastructure has been extremely rewarding and satisfactory.

From a learner's point of view, module feedback suggest that this innovative learning infrastructure indeed improves student learning and satisfaction. On one occasion during the MSc lectures, students voted in favour to extend the scheduled lecture time by one hour allowing them to play and discuss an online simulation again.

The state-of-the-art design of the Synergy Pod (figures 3 and 4) allows students to work on interactive projects, such as the Harvard Business Publishing online business simulation which the author administrated in class.

Figure 3: Synergy Pod MIS4011S SIMCA lectures MSc IT 39 & 40 (26-30 September 2018)

Figure 4: Synergy Pod MIS4011S SIMCA lectures MSc IT 39 & 40 (26-30 September 2018)

Figure 5: Students collaborating in Synergy Pod

Figure 6: Satisfied students

Figure 7: IT Management – Cyber Attack Simulation (Initial Results)

Figure 8. IT Management – Cyber Attack Simulation (Improved Results)

As a direct result from having used the Synergy Pod infrastructure for one of the author's MSc IT modules, we decided to administrate the overall MSc orientations for intake 41 in this dynamic learning environment (Figure 9) introducing students to the classroom they will be using throughout their studies at Kaplan and UCD in Singapore.

Figure 9: Synergy Pod Orientation for incoming UCD students MSc 41 (28 October 2018)

Conclusion

We all have access to the same technology, applications and tools, however, achieving competitive advantage in the highly competitive educational industry forces today's and tomorrow's educator to innovate. Meaningful and actionable innovation will not only help us to stand out, however, also improve the ways we design and deliver relevant and highly engaging curricula to the new generation of students.

The author is very much looking forward to delivering forthcoming modules in the Synergy Pod and has started promoting this fantastic learning environment to both UCD and local faculty.

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The lecture is dead, long live the lecture!

Christopher W. Harris *Executive Dean, Academic & Industry Engagement, Kaplan Higher Education Singapore*

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The Lecture is dead.

You hear it from educational technology companies, you hear it from publishers, from industry leaders. In a wonderful bit of irony, I even once heard it in a lecture!

Law Professor Peter Waring from the Singapore Murdoch Campus recently even won a debate in the affirmative, the topic? The Lecture is dead (Murdoch University, 2018).

So is it? I contend it's not and if I'm wrong I really don't want it to die and I'll *lecture* you as to why. Here are my responses to some arguments getting around the place:

1. We don't need lecturers now that we have The Google (any company whose executives don't need to turn up to Senate hearings deserves the definite article).

The idea that because information is widely available, the novice does not need a guide to orient them through it is a flat-out fallacy and unsupported by research. Worse, the Google hasn't had to learn this information itself; as Monash Professor Neil Selwyn proffers: the beauty of human lecturers is that they've had to go through the method of learning it themselves and can model that process of thinking out loud as they go (2018).

2. Technology has made the necessity to go to a place of learning obsolete.

Ah, but we've heard this presumed before, with the invention of a superior technological invention: writing. Thus was Theuth's contention to Ancient Egyptian god Thamus, according to Plato's telling, at the discovery of writing; it would make the Egytians "wiser and give them better memories" when compared to pure speech (p. 1). And yet later, despite this foretelling, would come another great period, the Greco-Roman one with its forum and parliament, not dissimilar to ours today, ringing anew with rhetorical cadences. As Isocrates so said: "there is no institution devised by man which the power of speech has not helped us to establish." (Delphi, 2016). Sure, they (nay) say, but they didn't have the internet. True, so what do we see when the internet we surf? Why TEDTalks! A beautifully *lectured* discourse on the subject of the orator's passion, perfectly distilled to a teasingly brief 14-minute shot of inspiration.

3. Whole institutions exist with online only courses.

Yes but many of them are for mature-age or non-traditional students with cognate work or other higher learning pedigrees and most rely on some online re-packaging of what medium exactly? The lecture! And, while I'm at it, why the sub-text about lec. and tech. being mutually exclusive?

A good lecturer will know when other media are better for the message or, conversely, when a good story will do the trick, and a reflective lecturer (Brookfield, 1995) is able to make this determination by virtue of the fact that they are not a machine.

Yet despite these virtues, Dr Bror Saxberg from the Chan Zuckerberg Initiative, in an interview in this very volume of JALT, is quick to caution us on the limits of lecturing, notwithstanding what Saxberg says are its values for learning tourism and for enabling the audience to think about the world in a different way for 20 minutes. Saxberg says, "despite these values, we must never be confused into thinking a 20-minute talk about string theory has made you a string theory physicist!" (Saxberg, Harris & Rudolph, 2018, p. 48).

So maybe then with all the options available to academics, it is only that the bad lecture is dead, so long live the good lecture.

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Nigel Starck

Independent Member, Academic Board, Kaplan Higher Education Singapore

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The trouble with some textbooks offering guidance on grammar and expression is that they wallow – not without a self-imposed touch of irony – in lexical quagmires. A quick visit to the shelves of my own study demonstrates the point:

> One manual identifies certain 'inducements to inversion in the syntactic form as in the paratactic'.
>
> 'It is sometimes maintained,' says another, 'that the Cognate Object is adverbial in force, and therefore should be classed with the Adverbial Accusative.'

I must confess to finding a certain perverse pleasure in interpreting such opaqueness; there is something deliciously indulgent about sloshing through the sticky syntax. Other searchers for advice, I further confess, are not necessarily so disposed. They want authority of opinion, free of technicalities, delivered in a painless and undemanding fashion.

Those virtues are apparent in Sam Leith's Write to the Point, as one might expect from an author of seniority and distinction in British journalism – literary editor at the Spectator and columnist for the Guardian and the Evening Standard.

His advice bridges both the tyranny of distance and the generational gulf. I tried it out by copying some key passages – on parenthetical expression and the passive voice – and discussing their content with Australian students in the final year of a journalism degree. They liked the user-friendly form of address and grasped the unfailing logic.

Smartphones were brandished; key passages photographed; messages received. They read, marked, learnt and (so I am persuaded) inwardly digested. What gives Leith's book its appeal, apart from the enduring quality of its teaching, is its capacity for illustrating the argument by earthy anecdote. He recalls, by way of example, the day in 2008 that Times writer Giles Coren 'lost his rag completely' when a sub-editor removed a solitary indefinite article (the word 'a') from a restaurant review. Leith quotes Coren's rant (emailed to the newspaper's team of sub-editors) in all its earthiness:

> When you're winding up a piece of prose, metre is crucial. Can't you hear? Can't you hear what is wrong? … It's not fucking pre-GCSE scansion. I have written 350 restaurant reviews for The Times and I have never ended on an unstressed syllable. Fuck, fuck, fuck, fuck.

In more lyrical and romantic mood, he quotes a love letter from Ted Hughes to Sylvia Plath before their marriage turned to pain:

"Above all, save every whisper until Saturday, save every little bit of you … I shall pour all this into you … and fill you and fill myself with you and kill myself on you."

This catholic text turns, too, to writing for the screen (albeit in brief), social media, selection of fonts, job applications, and letters of condolence. Along the way, it offers sustained enlightenment on building sentences, applying apostrophes, deciding between the full stop and the semi-colon, exercising the gerund, and engaging with metaphor, simile and analogy.

Leith is a master of his craft. His book deserves to grace many a recommended reading list right across the syntactic, paratactic, cognate, and accusative spectrum – even those ending on an unstressed syllable.

Holmes-Henderson, A., Hunt, S., & Musié, M. (Eds.). (2018). *Forward with classics*. London, England: Bloomsbury.

Nigel Starck

Independent Member, Academic Board, Kaplan Higher Education Singapore

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There is something singularly ghastly about clichés when used by educational establishments. By definition, such institutions really ought to know better. But they don't.

So it is that my former school proclaims itself today, on its website, as a 'forward thinking … educational community' that promotes 'values of respect and co-operation'. What a load of old cobblers. I prefer the 1950s model, when the shabbily gowned teachers (exclusively male and ex-military) exercised the cane and threw chalk at miscreants in a richly backward-thinking obsession with corporal punishment. The fabric of the gloomy old joint was largely driven by disrespect and dislocation. It bred a tougher carapace for the vicissitudes of life, though, than the soft-shell product of today's touchy-feely forward-bloody-thinking.

Nevertheless, I must concede that there was one spectacular instance of beneficence in those times past. The Latin master was renowned for his unusual largesse. In his secondary role as the fulcrum of the drama society, he would have us round to his house, fill us up with his home-made wine (concocted from gooseberries, raspberries, strawberries) and send us unsteadily into the night proclaiming Shakespeare to the stars. No-one complained.

Yet most of us failed miserably the GCE 'O' Level Latin exam that unfortunate, if memorable, year. It wasn't so much the wine as our school's own state of confusion. The exam came in two parts. One paper concerned itself with grammar and syntax; the other with translating the classics (Caesar's Gallic Wars, Martial and Ovid and all that stuff). The first was on a Friday; the second on a Monday. I can't recall, now, which of them was the grammar job and which was the translation. The trouble is, back then, the school appeared unable to remember either. We trooped into the exam room on the Friday, having swotted up – on the official in-house advice – for one sort of paper, only to be confronted by the other. Again, no-one complained. Some feverish further swotting occurred over the intervening weekend; but it was all too late. Recovery from Friday's uniform disaster was unattainable; I sense, maybe, that in any case candidates had to pass both parts.

Regardless of that personal misfortune, for I was one of the sizeable cohort that recorded an 'F', I find two positive factors endure to this day. I love my wine, and I have an abiding respect for Latin. The five years of classroom declension and conjugation – regardless of the ultimate examination paper cock-up – taught me some lasting lessons about sentence construction, about mood and voice, and about such wonderfully esoteric applications as the dative, the gerund, and the ablative absolute. They have empowered my journalism and my authorship in the fuller flower of my being; those years were not wasted. I welcome, accordingly, the publication of Forward With Classics, even if it does have a dreary title and some ill-chosen, out-of-focus, crudely cropped illustrative plates.

This book reports, in a series of essays and reflections, the gradual restoration of classical studies – linguistic and cultural – in societies worldwide. Such teaching had fallen into a sad state of neglect by the early 1980s; then, Dei gratia, a resurrection came gradually upon us. There emerged a pan-pedagogical push, a revival driven by some remarkable inventiveness of ideas: Latin clubs (presumably without fruit-flavoured grog in this PC world); bingo with Roman numerals; a cartoon character called Minimus ('the mouse that made Latin cool') for little learners; and dress-up sessions to enact classical drama.

In the UK, from where springs the book's driving force, there has been, too, some powerful support of a political kind. Michael Gove, a Conservative secretary of state for education, emerged as an impassioned advocate of the Classics rediscovery. Forward With Classics traces how the major changes, in favour of reviving these studies, arose with the newly elected UK coalition government of 2010. Latin and, albeit to a lesser extent, other classical subjects were enlisted in what was seen as an advance in social justice. However, their enactment was limited to schools in England; those of Scotland, Northern Ireland and Wales operate their own systems under devolved powers. English pupils and teachers alike are quoted – exhaustively, and no doubt selectively – as saying how much the policy has enriched their overall education experience. Mr Gove, as the erstwhile minister at the head of the push (he has now been shifted to another portfolio), is also quoted in the book, from the year 2014. He speaks as an apparent champion of egalitarianism:

> Classics is one of those subjects where most university places are taken up by independent school students, and I think that's wrong. We should be giving state school pupils the chance to compete on a level playing field.

'On yer, Govey. To you, to the editors of Forward With Classics, and to all connected with this admirable initiative of recovery, I can say only: gratias tibi ago. And … nunc scripsi totum pro Christo da mihi potum.[1]

[1] The Latin quotation is a scholarly joke. Monks, traditionally, would sign off a sacred parchment with: *Nunc scripsi totum pro Christo, da mihi potum*. 'Now I have written so much for Christ, give me a drink' (rough translation). But if the comma is shifted, it becomes: *Nunc scripsi totum, pro Christo da mihi potum*. That, even more roughly, can be translated as 'Now I have done all that writing, for Christ's sake give me a drink.' The author in his youth was much amused by the capacity for playfulness in Latin, which gave rise to such constructions as *Caesar sic in omnibus*.

Palmer, P. J. (2017). *The courage to teach: Exploring the inner landscape of a teacher's life*. San Francisco, CA: John Wiley & Sons.

Leo Kee Chye
Adjunct Lecturer, Kaplan Higher Education Singapore
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As an educator with two decades of teaching experience, the last thing I need to be told is to re-examine my career as a teacher, reflect on my life and passion, and, if possible, return to my true self to be a good teacher. However, this is exactly what Parker Palmer advocates in his book. Palmer believes, "…good teaching cannot be reduced to technique…" (10), just as you don't expect using role-playing to teach organic chemistry, he adds.

Parker J. Palmer is a writer, speaker and activist who focuses on issues in education, spirituality, and social reform. He holds a Ph.D. in sociology from the University of California at Berkeley.

According to Palmer, it is no secret that most teachers suffer from bureaucratic harassment, put up with unreasonable expectations from parents and institutions, are at the mercy of student ratings, are unappreciated by the public and are poorly compensated. It is little wonder some good educators have given up altogether even the pretence of teaching.

A teacher needs to reclaim the motivations and repossess the passions that gravitated him to his profession in the first place as well as finding "an approach to teaching that respects the diversity of teachers and subjects" (12).

Identity and Integrity in Teaching

Palmer argues rather than technique, "…good teaching comes from the identity and integrity of the teacher (10). According to a saying by Socrates, "An unexamined life is not worth living". Palmer in the same vein believes, "good teachers must live examined lives and try to understand what animates their actions for better or worse" (xvii).

By identity, Palmer refers to discovering who and what you really are rather than who and what you are trying to imitate. He writes about a Professor X who tried to imitate his favourite mentor's style of teaching. However, Professor X and his mentor could not have been more different in terms of personality and temperament. Ultimately, Professor X came across, to his students, as unnatural or worse, a cheap knockoff.

By integrity, he means the limits and demarcations in one's beliefs, principles and morals. Or, to put it succinctly with a quote from Margaret Thatcher: "If you set out to be liked, you would be prepared to compromise on anything at any time, and you would achieve nothing". A good teacher needs to know where he stands, with unwavering conviction, not compromising on his cherished principles.

The book's first chapter is indeed not for the fainthearted as he requires courage in self-discovery, stands up to possible ridicules and cynicisms, and not succumbs to pressure and mediocrity.

A Culture of Fear (Education and the Disconnected Life)

Palmer notes "the more one loves teaching, the more heartbreaking it can be" (11). It is precisely this fear of being disappointed, embarrassed, and ridiculed from students, colleagues, subject matter, administration, and public, some teachers put up a façade and barricade themselves behind a wall of ambivalence, dispassionateness, and distancing. Only through the acceptance of himself will he "speak and act from a place of honesty about being fearful rather than from the fear itself (61).

The Hidden Wholeness (Paradox in Teaching and Learning)

In the third chapter, Palmer advocates paradoxical thinking which "requires that we embrace a view of the world in which opposites are joined, so that we can see the world clearly and see it whole" (69). Able to keep within the boundary of a subject matter, yet at the same time remains open to alternative perspectives and solutions is a mark of a good teacher.

The learning space fenced off by a good teacher should make students feel safe to roam and explore without inhibition; while not giving students a false sense of security that prevents them from climbing over the fence to make further discovery.

"The space should invite the voice of the individual and the voice of the group" (77). Every individual should able to voice out his opinion without reservation from himself and without harassment from others. The collective voice is important in gauging the overall process and direction of the group, while not neglecting the individual voice which may be easily deafened by the rest.

While it is crucial to know the grand and lofty goals of certain subject matters, the personal motivations of individual are equally important in the learning space. Palmer believes: "The space should honour the 'little' stories of the individual and the 'big' stories of the disciplines and tradition" (79).

Learning is never complete as a solitary process but as a dialectic one that demands community engagement to challenge your preconceived ideas, to compete for the best explanation, to expose your biases or as Issac Newton aptly put: "If I have seen further it is by standing on the shoulders of Giants." Yet, the personal learning space of individuals is still sacred as it allows for reflection and intuition, and should be not violated.

Palmer writes: "The space should both welcome silence and speech" (80). The learning environment should abhor neither silence nor speech, eliciting speech from students during discussion and clarification, but at the same time carefully balanced with momentarily silence for reflection and consolidation.

According to Palmer, it is no paradox that paradoxical ideas in learning and teaching, when in the right concoction, instead of confounding, uncover a plateau of previously hidden wholeness.

Knowing in Community (Joined by the Grace of Great Things)

Palmer proposes that "to teach is to create a space in which the community of truth is practiced" (92). The whole is greater than the sum of its parts. A good teacher should leverage on the synergistic prowess that comes within a community. Rather than a top-down approach from the subject matter to the teachers and finally disseminate to the students, this ecosystem places teachers, students and other participants to interact with one another, yet everyone is revolving the subject matter which is at its nucleus of this community. Students are not simply passive participants but part of the contributors as well; teachers other than to deliver and instruct also serves an irreplaceable role of a facilitator.

Teaching in Community (A Subject-Centred Education)

Instead of teacher-centric or student-centric, Palmer advocates a subject-centred approach, where teachers, students as well as the community resources, co-build and shape the subject matter together. This is analogous to sand-castle building. Rather than to have the teacher demonstrating the process of castle-building from beginning to end, or the students having to be guided in every step, both the teacher and students could have collaborated and chipped in at the same time, with every participants claiming ownership to the final completed enterprise.

Learning in Community (The Conversation of Colleagues)

Palmer suggests that teachers "must observe each other teach… we must spend more time talking to each other about teaching" (148). However, this comes as an insurmountable challenge for most educators, including yours truly, whose egos are often bigger than our head. So often we have been confronted with the statement "Why do you see the speck that is in your brother's eye, but do not notice the log that is in your own eye" (Matthew 7:3)? Palmer contends it takes courage to share and before one embarks on starting this conversation of colleagues, one should candidly do some soul-searching. To best summarise Palmer's suggestion, I shall quote from Luke (14:11): "For everyone who exalts himself will be humbled, and he who humbles himself will be exalted." Only when one is humbled, one is willing to share and, at the same time, be receptive to constructive criticisms. Palmer wants good teachers to lead and take charge and make examples of themselves. "If we who lead and we who teach would take that counsel to heart, everyone in education, administrators and teachers and students alike, would have a chance at healing and new life (167).

Divided No More (Teaching from a Heart of Hope)

Palmer examines: "Is it possible to embody our best insights about teaching and learning in a social movement that might revitalise education" (169)? Although most educators may concur with Palmer, most, if not all, lament the uphill struggle against the 'system'. Most educators regard the education reform battle as already lost before the first shot is even fired. Palmer hopes educators in gathering courage will "make one of the most basic decisions a human being can make, which I have come to call the decision to live 'divided no more,' the decision to no longer act differently on the outside than one knows one's truth to be on the inside" (173).

Conclusion

Palmer has shattered many of my preconceived notions on being a good educator. In his book, he weaves an unassailable case for reform both on a microcosmic (individual) and macrocosmic (community) level.

That does not mean, however, that this book is perfect. The philosophical, at times tautological, and at other times Zen-like, writing style makes it too easy to pass off the book as another New Age, Self-Help book with esoteric preaching. Take, for example: "When I do not know myself, I cannot know who my students are… When I do not know myself, I cannot know my subject" (3). Or: "We did not merely find a subject to teach – the subject also found us (26); which bears an uncanny resemblance to a Zen master's "You do not need to go in search of the transcendent, but the transcendent will seek you out."

While Palmer's intentions are laudable, there is always a possibility that an educator delving into his inner world may discover not his identity and integrity but more pride, ego and corruption. Moreover, if you are looking for a ready-made recipe and a time-tested technique to make you a consummate educator, keeping your students in constant awe, this is not the book for you.

Despite the mentioned flaws and the writing style being too esoteric for my liking, the insights offered by Palmer do turn my previous convictions about good teaching on its head. Before reading this book, I could not reconcile the fact why I need courage to teach. Only upon my completion, I could not agree more that, to be a good teacher, I need to face my own demons, conquer my fears, bring down my façade, unlearn and relearn, defend my cherished convictions, stand up to authority and institutions, share and take criticism. Now it makes sense. It takes *courage to teach*.

Su, F., & Wood, M. (Eds.). (2017). *Cosmopolitan perspectives on academic leadership in higher education*. London, England: Bloomsbury

Michael D. Evans

Chairman, Academic Board, Kaplan Higher Education Singapore

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I was very much attracted to this book, having spent much of the last 20 years in various leadership and executive level positions in both public universities and private higher education institutions in Australia, with many international links. The issues of leadership in an academic setting have become more and more pronounced as major forces of change impact on the sector. These include globalisation and the threat of market-based competition partly fuelled by emerging technologies and the developing collaborative economy; the rise of managerialism with a push for measureable outcomes and accountability; and the drive for improved rankings by universities, with global accreditations and affiliations. All of this is coupled with increased participation in higher education globally and the emergence of students and employers as consumers with increased global mobility. That is certainly a lot and I am sure it is not a comprehensive list.

In my experience, the leaders chosen to deal with these issues are drawn from a relatively small pool of scholars, often developing their own leadership skills through their experience as scholars, and in collaborating with other scholars, then applying this to leading and managing major entities. This is a tried and tested way to develop leadership in a collegial environment, but one wonders whether all the necessary skills are developed in this way to tackle the major issues confronting the sector. I feel this partly depends on the mission of each institution and how its core purpose sits within its own community. One could argue that different leaders are needed for different types of institutions: diversity requires diversity in style. Anecdotally we can see this in that recruitment processes for leaders in highly ranked institutions often require experience at a similarly ranked institutions. 'Likes attract', presumably to preserve a culture and style that drives the high ranking. From a different perspective there is the emergence of new universities partly through the reclassification of polytechnic institutions and the entry of new private for profit and not for profit institutions. Higher education is developing into an increasingly heterogeneous sector. Essentially, there is probably no longer one leadership style, rather different leaders are needed for different institutions facing different environmental issues and challenges, and indeed missions. Diversity in the sector requires diversity in leadership.

Su and Wood have assembled some excellent chapters in this book that help put frameworks and clarity around some of these issues. After a well-researched introduction, the book is divided into three sections: the first being the development of some theoretical underpinnings to academic leadership; the second a series of narratives from experienced and largely successful academic leaders; with the final section devoted to a discussion of some future directions.

The introduction by Su and Wood explores the notion of a cosmopolitan outlook on academic leadership. They view academic leadership as "relating directly to the core academic functions of teaching and learning, research and services, as distinct from the managerial aspects of leading higher education institutions such as financial and strategic planning, marketing and human resource management" (1). They propose a view of cosmopolitanism focused on 'relationality' and 'interconnectivity'. Their view is formed after consideration of the etymology of the word tracing back to the Stoic philosophers where a person was seen as inhabiting "two worlds, a local and a wider community, seeing the individual as belonging to the wider world of humanity" (3). Paraphrasing the environmental movement: Think global. Teach local.

The chapters by Smyth, and Rizvi and Beech, discuss the theoretical basis of cosmopolitanism and academic leadership. Smyth critically addresses the emergence of neoliberalism and its influences on leadership in higher education manifest in increasing managerialism and a command style of leadership at the expense of collaboration and collegiality. He argues that academic leadership is in need of "considerable rehabilitation" (31). However, I was left wondering whether the factors I have identified above and the diversity emerging in the centre means that one leadership style fits all entities from traditional universities to new private higher education providers, or is diversity necessary to approach the forces differently in different contexts.

Rizvi and Beech trace the history of cosmopolitanism and provide solid support for the view proposed by Su and Wood. They too identify the forces of neoliberalism as potentially reducing cosmopolitanism to a commodity, and accordingly, rendering it banal. Education needs to take up its role in developing understanding of intercultural differences, not commodifying a standard product. Rather the focus should be on critical cosmopolitan learning displaying the virtues of: historicity; relationality; reflexivity; and criticality, leading to conversations that "are necessary for living in an era of ubiquitous global mobility and connectivity. These are the conversations for which academic leaders could usefully assume a key responsibility" (53).

In terms of academic leadership development, the cosmopolitan transition to being a leader involves dialogue in different settings, usually with global experiences, all of which that is very much relationship based. In this way, leaders develop attributes such as integrity and honesty, but also enthusiasm, excitement, commitment and passion are seen as essential elements. The narratives in part 2 of the book demonstrate leaders with these attributes as well as self-knowledge, knowledge of their institutions, people and the environment. All attributes can be seen as developed as

part of a cosmopolitan journey.

Accordingly, the Section 2 narratives are particularly valuable in providing real cases of leadership development, in different settings, and facing different political, social, and economic challenges. How does a Japanese woman rise to a leadership role in a traditionally male dominated sector? How does a Jesuit priest manage the challenges of leadership in a hostile political environment? What about an outsider as academic leader in an Afrikaans-speaking, male dominated university? These narratives are compelling reading and demonstrate the vital role of cosmopolitan learning in leadership development and success, in the face of significant counter forces and challenges.

The final section aims to address Future Directions in academic leadership. Layer addresses many of the factors identified above noting the key areas of rapid change as 'delivery' of learning; subject development and professional development. If not managed carefully the development of conformity and control styles of leadership may stifle innovation and indeed knowledge creation at the heart of higher education occurring within a scholarly environment (172). Cook-Sather and Felten consider the ethics of academic leadership and suggest that 'an ethics of reciprocity and the practice of partnership in teaching and learning, might serve as a bridge between dominant, neoliberal values and … "an ethics of connectivity" (175).

To me this chapter is the beginning of a new debate, embracing more about technology, market competition, consumerism and society's expectations of students' output, and the need for academic leaders versus managers. Indeed, what is the role of a university? Is sector diversity desirable? What impacts on the type of leaders, style and the culture developed within the institution? What does the degree of the future look like with credentials, MOOCS, etc.? Disruptive change might not replace Harvard or Oxford, but what if Harvard offered a new form of qualifications and were closely linked to the forces of neoliberalism? How would the smaller, low ranked and more expensive regional institutions survive? This part of the future of commodification of education will challenge our traditional views on higher education and hence academic leadership. It is to be resisted or embraced? This most valuable book has helped me conceptualise my own experience and development as an academic leader. Like many in higher education, I did not initially seek a leadership role, rather inherited them, and often felt like the last one standing. This is a function of the older notion of a rotating chair of department – often elected by the faculty. In other situations, I have been the nominee of a Vice-Chancellor, and in other cases, thrown to the wolves of the headhunting worlds.

Overall, I strongly recommend this book as a significant contribution to the debate of academic leadership and further the role of higher education institutions. The theory elements have stimulated revision of my own view of the sector and the forces shaping change while the narratives are intriguing in demonstrating the role of cosmopolitan learning in the development of successful academic leaders in a number of different contexts.

Mills, G. E., & Gay, L. R. (2016) *Education research: Competencies for analysis and applications*. London, England: Pearson Education.

Nelson Ang

Assistant Director, Curriculum and Assessment, Kaplan Higher Education Singapore

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Introduction

Educational Research: Competencies for Analysis and Applications was first published in 1976 as a 354-page tome when I was barely two years old. The current 11th edition is testament to the book's applicability and relevance, successfully enduring the trial of time; key considerations within which continue to underpin educational research. The authors' intention to write a how-to manual for educational research is clearly evident. This book is the toolbox-that-has-everything which beginning researchers would need and very much appreciate; that the book doubled in size over the past 40 years is neither coincidence nor accident. Indeed, a significant update to the 11th edition is the revision of Chapter 3, Literature Review, to incorporate influences of technology on how literature is curated.

Literature Review: Beyond the Library

> The review of related literature is often seen as a necessary evil to be completed as fast as possible so that one can get on with the "real research." This perspective reflects a lack of understanding of the purposes and importance of the review and a feeling of uneasiness on the part of the students who are not sure how to report the literature (107).

The Literature Review has constantly baffled beginning researchers, especially the purpose and scope of the review, hence the choice of literature. More often than not, the researcher loses his or her voice and erroneously takes on the role of a reporter and merely repeats what has been said (after paraphrasing of course).

The literature review begins with identifying and locating relevant documents bearing trustworthy information related to the research problem. In this regard, the provision of search strategies for library catalogues and the Internet in the 11th edition is a useful companion on the search adventure. It comes complete with, step-by-step guidance of searching the ERIC database, fully illustrated with the aid of screenshots, as well as, suggestions of handbooks, go-to databases, websites, and professional organisations. However, the recommendations seem rather US-biased. Personally I find that there is a noticeable difference in the sensibilities of researchers from both sides of the Atlantic pond and wonder if these recommendations will skew beginning researchers' perspectives of educational research.

A Potential Bias?

A case-in-point on the difference in sensibility can be found in Chapter 10 – Experimental Research, which incidentally is significantly revised "to reflect 21st Century discussions" in the 11th edition (5). The general consensus in the United Kingdom is to exercise extreme caution when setting up experimental research to the point of avoidance. Indeed the British Educational Research Association (BERA) is explicit in its charge to researchers in its published Ethical Guidelines for Educational Research (2011):

> Researchers must take steps to minimise the effects of designs that advantage or are perceived to advantage one group of participants over others e.g. in an experimental or quasi-experimental study in which the treatment is viewed as a desirable intervention and which by definition is not available to the control or comparison group respectively.
>
> - BERA, 2011, p. 10

My own experience working with colleagues from the U.K. is also reflective of this position. Minimising advantage to a group of students is counterproductive in the experimental setup because the driving motivation for doing so is precisely to prove that one method/intervention is advantageous over the other and "establish cause-effect relations" (286). How might one then begin to minimise the advantage that one group of students may potentially gain without distorting the findings and yielding no results from the study? Conversely,

> In experimental research, the researcher manipulates at least one independent variable, controls other relevant variables, and observes the effect on one or more variables. The researcher determines who gets what; that is, the researcher has control over the selection and assignment of groups to treatments (286).

I have found too from my experience working with colleagues from the U.S. that randomised control trial is deemed necessary for yielding valid evidence to conclude on the efficacy of intervention/treatment. Perhaps it is then not surprising that the American Educational Research Association's (AERA) Code of Ethics (2011) is devoid of its British counterpart's warning about the application of experimental research.

Indeed in the discussion of Ethics in Chapter 1, Mills and Gay devoted a significant portion of the section to "Ethical Issues Unique to Qualitative Research" (39). In this section, they claimed that "some features of qualitative research raise additional issues not typically encountered in quantitative

research." Further into the section, Mills and Gay then charged qualitative researchers "to convey with confidence that research participants will not suffer harm as the result of their involvement in the research effort" (41). How might potential harm be unique to qualitative study?

Nevertheless, the perceived U.S.-bias aside, this is a handy book that I wish I had when I was writing up my research plan and dissertation many eons ago.

The Rest of the Tool-Box

As mentioned earlier, this book is a well-stocked toolbox that researchers, especially beginning ones, will find useful. It begins with delineating the research process before expounding on the design, data, and writing. If putting together a research piece is akin to building a house, Educational Research provides the how-to, templates of building plans (10 in all!), tools, and even the paint for the exterior walls.

Despite the wealth of content, it is not immediately clear if students, who are about to embark on an educational research journey, would be enabled to answer the most fundamental question – what good would emerge from my study? In highlighting theories, personal experiences, previous studies that can be replicated, and library searches as the four main sources of research problems, it is unclear if Mills and Gay are challenging their readers to put a dent in the educational universe or providing them with yet another tool to progress towards that dreaded assignment deadline.

Now, if only there were an app for this book.

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Jürgen Rudolph

Senior Lecturer and Academic Partner Liaison, Kaplan Higher Education Singapore

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It is an excellent sign when a textbook enters its 11th edition as it signals a high adoption rate by academics and thus high quality, and Leedy and Ormrod's primer Practical Research is no exception to that observation. Paul Leedy had been Professor Emeritus of Education at American University – he passed away in 2002. Jeanne Ormrod is Professor Emerita of Psychological Sciences at the University of Northern Colorado. Pearson had previously been the world's largest publisher before the company recently decided to focus solely on education. Its textbooks are typically user-friendly introductions and reference tools with a mass market appeal. The book reviewed here is the 11th global edition. In its global publications, Pearson, according to the back cover of the tome, collaborates with additional educators across the world and consequently "features alterations, customization, and adaptation from the North American version". Apart from the global version, alternate versions of the book are available such as the North American version and also an e-book. The first two chapters are also available as a free download (https://www.pearsonhighered.com/assets/samplechapter/0/1/3/3/013374132X.pdf).

Practical Research is extremely well-organised and is a suitable primary reference tool for a course in basic research methodology from a broad, cross-disciplinary spectrum. Thus, it is not only relevant for students of Education but also those from many different disciplines, including Social Sciences, Natural Sciences, Medicine, Business Administration, Landscape Architecture, etc. In the argument of the authors, "[m]any basic concepts and strategies in research transcend the boundaries of specific academic areas" (4), and consequently, a wide variety of examples from the above-mentioned disciplines is provided.

In case anybody needed convincing, the Introduction persuasively argues that a course on research methodology offers "an unparalleled opportunity to learn how you might better tackle any problem for which you do not have a ready solution" (5). The book comes with very detailed contents (over 14 pages), a glossary, an index and appendices (that refer to some of the most common software employed in quantitative research, i.e., Excel and SPSS) as well as a detailed reference list. The book is divided into six main sections which are: (1) the fundamentals (describing the 'nature' of research); (2) focusing your research efforts; (3) quantitative research; (4) qualitative research; (5) mixed-methods research; and (6) research reports.

Unsurprisingly, the textbook covers familiar ground and essentially guides a novice researcher from the stating of the research problem to the final report. The authors argue that quality research demands careful planning and design, and as a result, a highly systematic, step-by-step approach is adopted, with practical suggestions throughout. Most academics would have their favourite textbook on research methods. (For me, it is Blumberg et al. for undergraduate business courses, Saunders et al. for postgraduate students, and Flick on qualitative research.) So why bother with yet another textbook on research methods?

There are many things about the book that I much appreciate. Succinct overviews are provided throughout. Each chapter contains checklists (which one could fill in at the various stages of research) and which I imagine could be helpful in ensuring clarity, critical reflection and comprehensiveness during the research process. These checklists may be of tremendous use for dissertation students at all levels and their supervisors. Also, as my teaching focus is on business and management subjects, it is refreshing for me to read examples from many other disciplines (including 'exotic' ones such as Musicology).

The emphasis on practical matters (which is already in the book's title) is laudable. For instance, outlines for both qualitative and quantitative research proposals are provided (136-137) and then elaborated on in a thoughtful and detailed away. A research proposal for a doctoral dissertation (assessing pre-service teachers' attitudes toward teaching African-American students) is then provided and critically discussed (150-152). Many of the chapters end with such extended examples of "Dissertation Analysis", with text excerpts on the left and extensive, evaluative comments on the right.

Another positive is the unbiased and fair approach towards both quantitative and qualitative research as well as a chapter (12) on mixed-methods designs. The text also contains many figures and tables; for instance, I found the illustrations of the various sampling methods in chapter 6 useful, and the same can be said about table 9.1 that systematically compares distinguishing characteristics of different qualitative designs (276). Other selected helpful advice is the publication of one's dissertation in the ProQuest Dissertations & Theses: Full Text (proquest.com) database as well as sections on presenting one's research at conferences and writing journal articles (367-370).

It would be remiss of me not to ponder the weaknesses of the text. These are mainly in the eye of the beholder, as are the above-discussed strengths. Despite the 'global edition' moniker, most examples are from the US, which is understandable to some extent, as both authors are American. A genuinely global edition with exemplars from around the world (including the global South) could have been thrilling. The fact that examples from many different disciplines are provided can be perceived as both a strength and a weakness. Zeroing in on a parent discipline (like, for instance, Business) could have provided more focus. Some

sections could have been more detailed. For instance, the philosophical assumptions of research are discussed on only one page (25-26), and there could have been a more historical approach to the discussion of research methods – however, one could counter-argue that a more philosophical and historical approach would have made the book less practical. Finally, to some extent, it can be argued that, as the book tries to be many things to many readers by discussing many different things, it perhaps does nothing outstandingly well.

While introductory and focused on the novice researcher, the book – over 407 densely-populated pages – has sufficient depth to also serve as a useful reference tool for more experienced researchers. I can certainly recommend the 11th global edition of this classic (first published in 1993) to research-active educators, and more specifically, dissertation supervisors and those who teach research method courses.

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Jürgen Rudolph

Senior Lecturer and Academic Partner Liaison, Kaplan Higher Education Singapore

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The book's hyperbolic title caught my attention as somebody who is involved in business and management education. As the title suggests, Parker's work is admittedly polemical rather than a detailed analysis (xiii). One could be tempted to dismiss a book with such a seemingly exaggerated title as a marketing ploy to sell books by the droves, with the purpose being to enrich both author and publisher. But Parker's book offers a serious, yet humorous, evaluation of the history and status quo of the business school, which unsurprisingly, is less-than-favourable.

Martin Parker is currently a Professor in the Department of Management at the University of Bristol and thus an insider of the very institution that he so fiercely attacks (he is well aware of the irony that he bites the hand that feeds him (15)). Professor Parker is a prolific writer, and this book is the most recent in a series of four books that explore alternatives to the current business school models as well as alternative forms of organisation. (The previous three publications of this tetralogy are Against Management (2002), The dictionary of alternatives (2007) and Companion to Alternatives (2014).

Martin Parker (without too much hope of succeeding) proposes to close down business schools and replace them with 'schools for organizing'. The 198-page book is organised into two parts (with a total of ten chapters) and usefully includes endnotes (with some excellent references) and an index. The first part analyses business schools from a historically- and philosophically-informed perspective and the very concepts of the business school and management are deconstructed. The second part explores alternatives to the status quo and outlines Parker's vision of a 'school for organizing' that is substantially different from the business school, as it is not merely focused on 'teaching capitalism' and the dominant market-managerial model.

In the first part, Parker argues that business schools are dominated by 'market managerialism' which, in his perspective and that of 'Critical Management Studies' (CMS), is but one of many forms of organizing. While the business school's account of the modern world mentions topics such as sustainability, diversity and corporate social responsibility (CSR) in passing, and like some kind of fig leaf, it offers the "promise of technology, choice, plenty and wealth" – and "capitalism is assumed to be the end of history, an economic model which has trumped all the others, and is now taught as science, rather than ideology" (35).

Parker opines that business school disciplines such as Economics, Accounting, Finance, Management Information Systems, Marketing, Human Resource Management, Innovation, Operations or Logistics, International Business, Strategy, etc. are neither neutral nor context-free. I quite enjoyed Parker's sarcastic descriptions of these subjects. Perhaps a reading sample is in order (one could accuse the author of quite a few things, but certainly not of a lack of satirical, deadpan British humour):

> *Human Resource Management* is the application of theories of rational egoism to the management of human beings in organizations. It is what used to be called 'Personnel', but now contains the implicit claim that the 'human resource' is an input to organizing that might be paralleled by the 'technological resource', or the 'financial resource'… Rather than being the end of organizing, or its fundamental precondition, the human is something to be engineered by using the sort of knowledge generated in organizational behavior. Despite its use of the word, Human Resource Management is not particularly interested in what it is like to be a human being… Human Resource Management is not on the side of the trade union, the worker" (29).

The third chapter (titled "What's wrong with Management") has wonderful historical discussions of management also from a literary perspective (which borders on the encyclopedic), including many cinematic classics. Amongst an astonishing number of literary references, there is Dilbert (my personal favourite amongst 'management gurus'), a cartoonist, and a wide range from Dickens' *Hard Times* to the TV serial *The Office*, and cinematic references from *Modern Times* to *Spiderman* (51-56). Gems include Ambrose Bierce's definition of the corporation from his *Devil's Dictionary*: "An ingenious device for obtaining individual profit without individual responsibility" (54).

The fourth chapter ("What's wrong with the Business School?") discusses the relationship between business schools, business leaders with MBAs, and the Global Financial Catastrophe of 2008. People with a vested interest in business schools may be quick to deflect the blame to 'the system' and some 'bad apples' – not forgetting that consumers borrowed too much and bankers behaved riskily (77). To Parker, the central issue is that the business school is "a factory for producing employees for capitalist organizations, a machine for producing a very particular kind of future" (81).

In the fifth chapter, the relationship between the business school and the (for instance, in the UK, increasingly privatised and 'marketised') University is explored, and here Parker accuses business schools of adversely affecting neglected and under-represented stakeholders:

> The US home owners with foreclosed properties based on sub-prime mortgages in 2008, the 1,129 people who died in the 2013 Rana Plaza sweatshop building collapse in Bangladesh, the boarded-up shops on the high streets of the city I come from in Northern England, the 100,000 people who live in Kiribati in the Southern Pacific and will see their island disappear in half a century (87).

While not directly responsible for all sorts of social, economic and environmental disasters, business schools may act as a "loudspeaker" for "market managerial capitalism" (97). Business students are invited to join such an unpleasant "utopia for the wealthy and powerful" that results in "environmental catastrophe, resource wars and forced migration, inequality within and between countries, the encouragement of hyper-consumption as well as persistently anti-democratic practices in work organizations" (158).

In a 'Fordist' and 'McDonaldized' University environment, managerial technologies include ranking and branding. For instance, "the ranking of academic journals means that only certain kinds of publications count", with non-tenured academics asking themselves: "Should I publish here? Should I say this? What grading will the students give me? How many citations do I have" (93)? Parker is aware that business schools are highly successful and oftentimes, provide much-needed financing to the University. Nonetheless, business schools are on occasion regarded as 'cash cows' that lack academic rigour.

Parker's critique of the business school can perhaps be summarised in saying that they teach a 'hidden curriculum' (a term partially associated with radical educators such as Paulo Freire and Ivan Illich). For instance, the 'hidden curriculum' in the 1960s was that business schools taught about white middle-class men's knowledge, not about women, people of colour and working class experience. And at present, business schools focus on the virtues of 'capitalist market managerialism' and do not teach enough about co-operatives, social enterprises, "degrowth, the beauty of small, worker decision making and the circular economy" (Parker & Starkey, 2018). (Degrowth advocates argue that overconsumption is the root cause of environmental problems and social inequalities. A circular economy is a counter-concept to the traditional linear economy (with a 'take, make, use, dispose' model of production) and a regenerative, more sustainable system in which resources are maximised and waste is minimised.)

After his critique of business schools in the first part, Parker develops his alternative vision of 'schools for organizing' in the second part of his book. Parker (like me) has a sociological background, and this makes it more understandable (in the sociological sense of Verstehen) that he wants to replace the narrow focus on for-profit enterprises by business schools with a very long list of institutions and their different ways of organizing:

> families, stewarding, retail co-operatives, markets, kinship systems, groups, networks, communes, tribes, partnerships, local exchange trading systems, hierarchies, polyarchies [forms of government in which power is invested in multiple people], democracies, city-states, trusts, Stiftung [German: foundation], co-producers, monopolies, communities, sociocracies [systems of governance which seek to achieve solutions that create harmonious social environments as well as productive organizations and businesses], NGOs, professions, family businesses, lineages, monopsonies ['buyers' monopolies'], institutions, trade unions, states, companies, councils, governments, clubs, cultures, worker co-operatives, totalitarian regimes, occupations, societies, foundations, holarchies [Arthur Koestler's alternative concept to hierarchies], matriarchies, solidarities, associations, Waqf [an endowment made by a Muslim to a religious, educational, or charitable cause], charities, non-profits, villages, sects, phalanxes, credit unions, provident or mutual societies and hybrids of all the above (115).

To illustrate his point, Parker offers two intriguing case studies. The first one is about Suma Foods, a British wholefood wholesaler with many laudable organisational innovations of 'self-management' – amongst other things, every multi-skilled worker is paid the same (each of the 161 employees earned £40,000 a year in 2016) and participates in collaborative, democratic decision-making, and Suma's products are all vegetarian, "cruelty-free" and 'fair-trade' (116-119). The second case study is about Premium-Cola, a German Internet collective with "no office, no fixed salaries, and no formal boss – just a moderator", that incentivised smaller distributors by offering an anti-volume discount (171-173)!

Parker's book ends manifesto-like: "[L]et's celebrate and explore multiplicity, and imagine the fantastic world we might create together. Let's bulldoze the business school" (180). While I find Parker's critique of the business school partially justifiable, and while I share his concerns about a humane workplace, CSR and environmental sustainability, some of his commentary appears to be polemically, and quite entertainingly so, over-the-top. His idea of 'schools of organizing' is, however, more revolutionary than reformist, and, being a historically-informed skeptic of revolutionary zeal, it is here where I disagree strongly.

Bulldozing the business school would throw out the baby with the bathwater. As Ken Starkey in a readable dialogue with Martin Parker argues, "business and finance are crucial to a healthy economy and society" (Parker & Starkey, 2018) – for instance, via the countless entrepreneurs who start small businesses, employ large portions of the populations, and who have learned the tools of the trade in business schools. And there is business school research "on the big social issues – environmental, social justice, social enterprise, eradicating slavery in supply chains, developing work opportunities for refugees", though there could be more of it (Parker & Starkey, 2018).

I believe that lecturers in management and business are uniquely positioned to teach organisational alternatives to their students within the existing framework. Despite his at times ferocious critique of the business school, Prof Parker himself is an illustration of that belief, as he continues to be in the employ of the 'business school' – which could be construed as a compliment to his employers past and present who at least tolerate alternative viewpoints in the

spirit of academic freedom.

While I am all for having (more) qualitative subjects (and minimally, electives of a more sociological nature), I find the quantitative subjects (like Accounting and Finance) still important. There are plenty of disciplines in business schools that focus on matters such as Organisational Behaviour, Human Resource Management, Organisational Development, Business Ethics and the like that may assist in addressing some of Parker's concerns, and it is hoped that there would also be at least sub-topics on concepts such as, for instance, the Learning Organisation and Organisational Learning.

To me, the whole argument of 'bulldozing the business school' and especially the second part of the book is unconvincing. If the author wanted to go beyond teaching modules such as, for instance, organisational innovation within the given framework, he and like-minded people could consider creating a Master Degree of Alternative Organising, or perhaps a MOOC or multi-MOOC certification for starters?

In conclusion, this is a thoughtful and provocative book that I enjoyed reading. There is plenty of good humour throughout the book. For instance, Parker reminds us that MBA also stands for 'Mediocre But Arrogant', 'Management by Accident', 'More Bad Advice' and 'Master Bullshit Artist' (13). As I am sure that Parker would not want a uniform and uncritical following, so let us agree to disagree agreeably.

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Jürgen Rudolph

Senior Lecturer & Academic Partner Liaison, Kaplan Higher Education Singapore

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Apologies for the foul language! The title of the book under review could easily be construed as a marketing ploy to increase book sales (comparable to the 'Complete Idiot's' and 'for Dummies' guides). To immediately counter such a first impression and sneaking suspicion, the reader may rest assured that this is a serious, important and excellent book by a famous anthropology professor, currently at the London School of Economics (and the author of other exquisite books on *Debt: The First 5,000 years* and *The Utopia of Rules: Technology, Stupidity, and the Secret Joys of Bureaucracy)*.

The first thought a reader of JALT may have could well be bemusement – how did a book with such a title, and with such fecal language ("bullshit jobs", "shit jobs", "bullshit society", "bullshitization", and my favourite: "de-bullshitization") ever get reviewed in a purportedly serious Journal on Applied Learning & Teaching? And what does such a book have to do with teaching and learning in the first place? I will provide a more elaborate answer to these admittedly good questions in the course of this review. A short, preliminary response would be that the book contains many academic examples of BS jobs – something our esteemed readers may wish to avoid. Moreover, and even more importantly, with a heightened emphasis on graduate employability, we would not want our students and graduates to end up in pointless jobs, and be able to prepare them for, and point them to, more meaningful professions and activities. In other words, we would not want to be part of a BS education that prepares for BS jobs!

Graeber's book is based on his 2013 essay "On the Phenomenon of Bullshit Jobs" that caused an internet sensation, and within weeks, was translated into more than a dozen languages. The essay and its easily-relatable title hit a raw nerve and images of people looking busy, but secretly checking their social media accounts, immediately came to mind. In 2015, an anonymous group plastered the London Underground with quotations from the essay (see photos in this review).

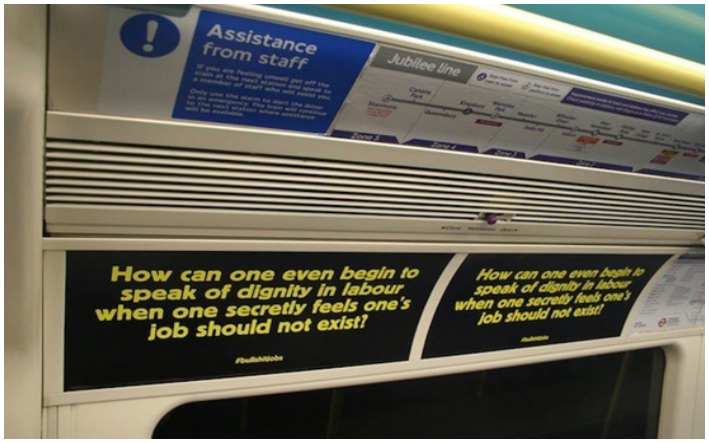

Figure 1: Photo from London Underground, 2015 (England, 2015).

Graeber conducted substantial qualitative research that enriches the text with many quotable testimonies and quite a few great stories. He analysed more than 250 thoughtful and detailed responses resulting from a Twitter request and also as a response to the original essay, and set up an email account doihaveabsjoborwhat@gmail.com (and also downloaded 124 descriptions people offered about their jobs in online discussions of his essay). But at the risk of stating the obvious, Graeber's is an unabashedly polemical work. His important book is about a "neglected aspect of the world of work" that constitutes "a real social problem" (146) – "one that most people don't even acknowledge exists" (270).

To be economical, and less offensive to our more sensitive readers (who have probably long stopped reading at this point), I shall henceforth largely abbreviate the subject matter as 'BS jobs', but regrettably, fecal language cannot be avoided altogeher. A BS job is defined as a "form of paid employment that is so completely pointless, unnecessary, or pernicious that even the employee cannot justify its existence even though, as part of the conditions of employment, the employee feels obliged to pretend that this is not the case" (9-10). If a BS job disappeared tomorrow, it may not only make no difference to the world, but perhaps even make it a better place.

A great example of a BS job is one that requires the employee (a subcontractor to the German military) to rent a car and drive up to 500km to oversee a person's computer being moved five metres from one room to another. Predominantly, BS jobs are in the administrative, financial and information sectors, and some of Graeber's favourite examples of BS jobs are hedge fund managers, political consultants, marketing gurus, lobbyists and corporate lawyers. (My corporate lawyer wife begs to differ.) However, Graeber's key characteristic of a BS job is phenomenological, via self-identification, i.e. if you feel your job is BS, it probably is; and conversely, if you feel that your job is not BS, then it is not.

While BS jobs are pointless, they are different from "shit jobs" (henceforth abbreviated as 'S jobs'). While BS jobs often pay well, S jobs are usually not BS; "they typically involve work that needs to be done and is clearly of benefit to society; it's just that the workers who do them are paid and treated badly" (14). S jobs "tend to be blue collar and pay by the hour", whereas BS jobs "tend to be white collar and salaried" (15).

Remarkably, Graeber hypothesizes that the social value of work is "usually in inverse proportion to its economic value (the more one's work benefits others, the less one is likely to be paid for it)" (196). And he can cite studies on the social return on investment that show, for instance, that city

bankers (with an annual salary of £5 million) destroy much social value, while nursery workers (with an approximate salary of £11,500) generate quite a bit of it (211). In other words, BS jobs 'take' more from society than they 'give' to it.

There may not only be a proliferation of BS jobs, but we may, as a consequence, live in a BS society (23). Signs of a 'bullshitization' of our economy are that "more than half of working hours in American offices" are spent on BS, and the problem may be getting worse (24). I should immediately mention here that Graeber's statistics could be regarded as ad hoc empiricism and should be, in my view, taken with a big pinch of salt. He refers to a YouGov poll of British people in 2015 and another one in the Netherlands – 37% of the Brits and 40% of the Dutch stated that they believed their jobs had no reason to exist. I find his qualitative testimonies far more compelling.

Graeber comes up with a hilarious five-fold taxonomy of BS jobs: Flunkies; Goons; Duct Tapers; Box Tickers; and Taskmasters. Flunkies or "feudal retainers" are unnecessary subordinates that are supposed to hang around and make the bosses look or feel important, such as doormen, underemployed receptionists (with silent phones), or useless secretaries or administrative assistants (with time to watch YouTube all day). Goons refer to people "whose jobs have an aggressive element" and who sell people things they neither need nor want, like telemarketers or PR agency employees (36).

Duct Tapers are staff whose jobs exist only because they "solve a problem that ought not to exist" (40) – for instance, IT staff who are hired to patch or bridge major flaws that their bosses are too lazy or inept to fix. Box Tickers are employees who "allow an organization to be able to claim it is doing something that, in fact, it is not doing" (45) – like the PR consultant whose reports nobody reads. Finally, taskmasters are unnecessary superiors who assign work to people who do not need management, and thus are the opposite of flunkies (unnecessary subordinates). In the worst case, taskmasters become BS generators whose role is to create BS tasks for others, to supervise BS, and to create new BS jobs (51).

In addition to the five categories, there are complex multiform BS jobs. For instance, a "flak catcher" is a combination of a flunky and a duct taper – a subordinate "hired to be at the receiving end of often legitimate complaints but who are given that role precisely because they have absolutely no authority to do anything about them" (60).

Graeber's favourite whipping boys are people employed in the financial sector. He variously states that "many of those employed in the banking industry are privately convinced that 99 percent of what banks do is bullshit that does not benefit humanity in any way" (64); that "one could argue that the whole financial sector is a scam of sorts, since it represents itself as largely about directing investments toward profitable opportunities in commerce and industry, when, in fact, it does very little of that… basically smoke and mirrors" (150-151); and, quoting one of his respondents, the "'entire [banking] sector adds no value and is therefore bullshit,' since finance was really just a matter of 'appropriating labor through usury'" (cited in 199).

The psychological aspects of BS jobs can be devastating, inducing "feelings of hopelessness, depression, and self-loathing" (134). Graber devotes two chapters to this "spiritual violence" (chapters 3 & 4) that is "directed at the essence of what it means to be a human being" (134). We do know from the popular content theories of motivation (Maslow; Herzberg; and McClelland) and the philosophical assumptions of leadership (McGregor's Theory Y) that people are not inherently lazy and do want to contribute something meaningful to society.

Figure 2: Photo from London Underground, 2015 (England, 2015).

BS jobs have a long history (for instance, in the Soviet Union and its satellite states – see further below). However, Graeber observes in "recent years" an enormous proliferation of BS jobs as well as "an ever-increasing bullshitization of real jobs" (190). Such trends appear to *defy the logic of capitalism* which is supposed to be in pursuit of profit maximisation, forever increasing productivity and ruthlessly eradicating inefficiencies. I found Graeber's answer audacious, yet intuitively convincing: one possible reason for the proliferation of BS jobs "might be that the existing system *isn't* capitalism" (191). It is *managerial feudalism* which, in many ways "resembles classic medieval feudalism, displaying the same tendency to create endless hierarchies of lords, vassals, and retainers" (191). The problem of BS jobs appears to be intrinsically intertwined with the problem of bureaucracy (which is the focus of Graeber's previous book *The Utopia of Rules*). Consequently, the rationale of BS jobs appears to be more political than economic (a population kept busy with make-work is less likely to revolt).

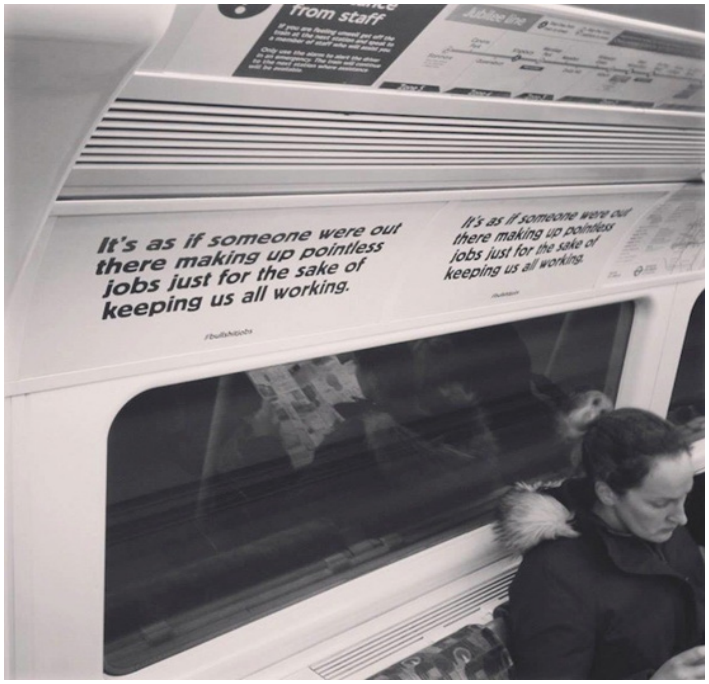

Figure 3: Photo from London Underground, 2015 (England, 2015).

I confess that reading Graeber's original 2013 essay (which is reproduced at the beginning of the book) immediately struck a chord with me. John Maynard Keynes (perhaps Britain's most famous 20th century economist), in 1930, predicted that technological advances would enable employees – at least in countries such as the U.S. and the U.K. – to work for only 15 hours a week. A 1960s counterculture slogan was "Let the machines do all the work" (cited in 258), and a newer version is the leftist la la land of 'fully automated luxury communism'. Most of us can testify that this never happened – in Singapore, where our journal is based, people are amongst the 'hardest-working' in the world, apparently clocking around 2,200 hours at work per year on average (and I am also – happily, I hasten to add – writing these lines while on annual leave).

While Keynes's utopian vision may be technically feasible, Graeber argues that through "some strange alchemy no one can quite explain", we have somehow arrived in an inefficient state not completely unlike the Soviet Union, "where employment was considered both a right and a sacred duty" (xvi). A cautionary example of the Soviet excesses of full employment via bogus jobs is that customers had to go through three clerks before buying a loaf of bread. Less extreme examples abound. For instance, in 20th century Europe, the public sector was 'featherbedded' (overstaffed) by social-democratic governments, and during the Great Depression in the U.S., make-work programs were implemented. And Graeber refers to Obama's 'smoking gun' of bullshitisation when the former President explicitly justified his sticking with the US health insurance system by warning that otherwise, up to three million form-filling jobs would be lost.

George Orwell had theorised already in the 1930s: "I believe that this instinct to perpetuate useless work is, at bottom, simply fear of the mob. The mob (the thought runs) are such low animals that they would be dangerous if they had leisure, it is safer to keep them too busy to think" (cited in 245).

From an ecological perspective, a mass reduction of working hours à la Keynes could be a major contribution to saving the planet. However, work appears to be commonly viewed as an end in itself, and there seems to be a consensus "that *not* working is very bad; that anyone who is not slaving away harder than he'd like at something he doesn't especially enjoy is a bad person, a scrounger, a skiver, a contemptible parasite unworthy of sympathy or public relief" (215). The perception of holding a BS job as "morally superior to no work at all" (220) is ironically shared by both the political right and left, with 'more jobs' being perhaps the only political slogan that both sides can agree on (though rightwingers may be more inclined to exclaim 'get a job!').

The perceived moral superiority of work appears to have theological roots. Graeber cites the Genesis, in which, after the Fall, God condemned men: "By the sweat of your brow you will eat your food" (cited in 222). In the 20th century's revival of Puritanism, work came to be increasingly valued as a form of self-discipline and self-sacrifice. Buckminster Fuller's quote is instructive: "We keep inventing jobs because of this false idea that everyone has to be employed at some sort of drudgery because, according to Malthusian Darwinian theory, he must justify his right to exist" (cited in 239).

This leads us to the *paradox of work*: while most people hate their jobs, their "sense of dignity and self-worth is caught up in working for a living" (241). Graeber's analysis goes even further: "Workers... gain feelings of dignity and self-worth *because* they hate their jobs" (242). This goes hand in hand with the unfair stereotype of the lazy and undeserving poor. Instead of directing their frustration at the paradoxical system of work, people often rather busy themselves with their social envy of the 'liberal elite' (a pejorative term used to depict members of the 'ruling classes' who are politically left of centre and perceived to be out of touch with the masses they supposedly support).

Graeber also intriguingly analyses the philosophical roots of the paradox: the Utilitarian "belief that what ultimately motivates human beings has always been, and must always be, the pursuit of wealth, power, comfort, and pleasure", must be complemented by an anti-Utilitarian doctrine (in the vein of Thomas Carlyle's "Gospel of Labour") "of work as self-sacrifice, as valuable precisely *because* it is the place of misery, sadism, emptiness, and despair" (244).

As Graeber has been a distinguished academic for more than two decades (Yale, Goldsmith's College, LSE), he unsurprisingly offers some highly readable illustrations of his theory from the realm of Higher Education. With reference to Ginsberg's *The Fall of the Faculty*, the increase in the numbers and power of university administrators is seen as a "power grab" that majorly distracts from the original mission of universities which is to produce scholarship and train a new generation of scholars (163). In essence, academia had a similar staffing explosion as other sectors. While the work of teaching and research has not changed fundamentally, the masses of additional staff are doing other things. Similar to other sectors, one of the causes of the bullshitisation of universities may be the desire to quantify the unquantifiable. In the logic of managerial feudalism, every "dean needs

his vice-dean and sub-dean, and each of them needs a management team, secretaries, admin staff; all of them only there to make it harder for us to teach, to research, to carry out the most basic functions of our jobs" (anonymous British academic, cited in 182). I found the extensive citations of 'Chloe', a former Academic Dean at a prestigious British university, revelatory:

It is to Graeber's credit that he does not offer simplistic solutions to the problem of BS jobs that he so richly describes in his book. I sympathise with his "call for the de-bullshitization of real work rather than firing people in unnecessary positions" (271). Graeber is a self-described (very mild-mannered) anarchist – who is credited with inventing the Occupy movement's slogan 'We are the 99%' – and it is thus unsurprising that he also considers more radical solutions. These include a "mass reduction of working hours or a policy of universal basic income" (270). However, Graeber's point is not to provide solutions, "but to start us thinking and arguing about what a genuine free society might actually be like" (285).

A few critical observations are in order. As was mentioned

> [A]ll nonexecutive Deans, PVCs [Pro-Vice Chancellors], and other 'strategic' roles in universities are bullshit jobs… An executive PVC or Dean (in other words, s/he who holds the budget) can cajole, coerce, encourage, bully, and negotiate with departments about what they can, ought, or might want to do, using the stick (or carrot) of money. Strategic Deans and other such roles have no carrots or sticks. They are nonexecutive… I was given a 75% full-time equivalent Personal Assistant, a 75% full-time equivalent 'Special Project and Policy Support Officer' and a full-time postdoctoral Research Fellow, *plus* an 'expenses' allowance of twenty thousand pounds. In other words, a shed-load of (public) money went into supporting a bullshit job… I spent two years of my life making up work for myself and for other people (cited in 53-54).

before in this review, I found the statistics that half of the jobs are BS jobs unconvincing. The samples are from the U.K. and the Netherlands (thus hardly representative for the rest of the world), and when people are asked whether they are making "a meaningful contribution to the world", we are perhaps setting the bar too high as we are not allowing for the possibility of them being modest when they 'no' (and even if the answer is 'no' that does not necessarily mean their jobs are 'BS').

Graeber's qualitative approach is much more successful than his quantitative analysis (and occasionally problematic generalisations). Nonetheless, there is the problem of a skewed convenience sample (people would have needed to read the essay) and selection bias, when it comes to the testimonies that he received. While I regard Graeber's book as largely polemical in nature, and there are certainly no claims of statistical representativeness, we should still be cautious with some of the more sweeping generalisations.

In particular, there is no persuasive evidence that half of all jobs are BS jobs. What Graeber has shown, is that there is much BS going on in the workplace and that many (perhaps even all?) jobs contain various amounts of BS. Another weakness is the neglect of non-Western examples, although it would be silly to accuse an anthropologist of Westocentrism. Graeber also seems to omit tech and other start-ups (that tend to have flat organisational structures) and larger, innovative organisations (famously radical examples are Valve, Morning Star and China's Haier) from his analysis. There is also nothing much on the gig economy which appears to be an important trend in the realm of work.

Graeber also appears to have missed out on some seminal literature that he could have used to supplement his argument. For instance, Parkinson's Law states that "work expands so as to fill the time available for its completion", and its originator C. Northcote Parkinson (1958) knew that there is not much relationship between the work to be done and the size of the staff to which it may be assigned. In Graeber's defence, he refers to Parkinson's Law (and another gem: the Peter principle) in his earlier work (Graeber, 2015, 3), so it appears to be more out of modesty, and avoiding repetition, that he does not refer to Parkinson's Law in the book under review. More recently, Hamel and Zanini (2016) suggested that reassigning some 24 million corporate 'bureaucrats' in the U.S. to more productive tasks could give the economy a $3 trillion boost.

With increasing automation, the question of what to do with the 'surplus workforce' will become ever more pertinent, and we will have to reconsider the meaning of work. It is hoped that Graeber's important book will be the start of investigating this issue from a new angle. A universal basic income has advocates from across the political spectrum, and pilot basic income programmes are being, or have been, conducted in Canada, Finland, Kenya and the U.S.

As an academic, one of my personal takeaways is to continue moving in the direction of meaningful activities, and away from those that reek of BS; and to spread the word within my circle of influence. As lecturers, we may be fortunate that the economic value and the social value of our work may be largely aligned (while for other jobs, they would appear to be fundamentally at odds).

All in all, Graeber's book offers a remarkably eclectic mix of everyday anecdotes and testimonies, historical insights, literary and pop-culture references as well as wide-ranging theoretical frameworks. *Bullshit Jobs – a Theory* is intellectually engaging, provocative and a hilarious, great read. It is the book that made me think the most this year, and I highly and unreservedly recommend it.

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