



Chasing Impact: The Tale of Three SoTL Studies

ABSTRACT

This article queries the notion of impact in studies of teaching and learning located within the field of Scholarship of Teaching and Learning (SoTL). Grounded in literature focused on measuring and challenging the impact in SoTL, and primarily on the “what works” question, the author proposes a rubric by which to judge various levels and dimensions of impact achieved in SoTL-focused projects. To operationalize it, the rubric is applied to three completed projects, which while differing in their initial scope and intended outputs were united by a shared goal of improving learning by the means of innovative teaching. By using the rubric to analyze these projects’ outputs, strengths and weaknesses of each project’s design and evaluation methodology are revealed. Diverse levels and dimensions of impact are identified and discussed. The author invites scholars of teaching and learning to use, test, and critique the rubric in the context of their completed or in-progress studies.

KEYWORDS

SoTL, impact, evaluation, innovation, innovative teaching

INTRODUCTION

Grounded in local contexts, but arguably having a potential for a “global reach,” the Scholarship of Teaching and Learning (SoTL) promises to “transform” the academy (Gilpin & Liston, 2009, p. 1). However, questions remain as to what this transformation means regarding its various dimensions of impact on learning, teaching, and broader education narratives. With some of these dimensions more easily quantifiable than others, the exploration of the nuanced nature of SoTL impact presents a unique challenge. While the discourse of measuring and querying impact is not new, recent advances in research on teaching and learning and emerging new types of impact metrics offer new opportunities in this field.

Exploratory in nature, the study I describe in this article acknowledges many persisting difficulties associated with measuring the impact of scholarship in quantifiable ways and pays a particular attention to nuanced, often hidden, and at times convoluted areas of SoTL impact. While primarily focusing on the “what works” question (Hutchings, 2000), various approaches to evaluating the impact in the field of SoTL are considered, ultimately arriving at a synthesized rubric by which different dimensions and outputs of impact can be analyzed. I apply the rubric to three empirical projects and use it to assess different layers of impact of each of these. I discuss each project’s impact, desired and achieved, in the context of the rubric, and in the process identify and clarify the strengths and weakness associated with each project. I see this effort as a work in progress, envisioning the endeavor of testing and refining the proposed rubric as a long-term project, with the hope of arriving at a comprehensive evaluation model useful across disciplines and contexts.

The three projects I examine differ by their intended levels of impact, ranging from a single unit (subject) to a course (degree) level, to university level and potentially transcending the confines of university. However, all three projects shared an aim of improving student experience. By using the proposed rubric to analyze these projects, I offer conclusions pertaining to the question of what wide-ranging impact entails and what forms this impact takes in and out of a classroom.

QUERYING IMPACT IN SoTL

The literature of SoTL discusses how impact can occur at various levels and affect different groups of stakeholders and how some types of impact are easier to define and quantify than others. For instance, Hoessler, Britnell, and Stockley (2010) frame SoTL as a process of trying and analyzing innovations in teaching and learning with the ultimate aim of enriching student experience. Others, among them Geertsema (2016, p. 122), focus on such processes as developing the notion of identity, enriching disciplinary expertise, and fostering better reflective practices. Querying both these views, Prince, Felder, and Brent (2007) challenge the broad claims of a priori causation between the study of teaching and learning and improved teaching and learning practices, separating projects into those that argue that, *in principle*, study of teaching and learning can improve teaching and learning from those that show it done *on practice*. Among practical ways to achieve a desirable impact, Prince, Felder, and Brent (2007) list making stronger alignment between research, teaching, and classroom experience; fostering interdisciplinary study of teaching and learning; and supporting student-staff collaborations. The last approach is particularly on the rise, with a growing body of scholarship focused on student-staff co-inquiry (Werder, Pope-Ruark, & Verwoord, 2016; Miller, 2013).

Beyond classroom-level impact, the study of teaching and learning can be instrumental in increasing institution's overall quality of teaching and learning. This can be achieved by building up department or faculty contextualized training programs and enhancing informal interactions between colleagues with an aim of disseminating and encouraging meaningful SoTL-focused practices (Chick & Brame, 2015). However, misalignments between SoTL agendas and institutional policies could pose a challenge (Schroeder, 2007). While SoTL agendas are defined by such difficult-to-quantify notions as exchange, increased participation, and diffusion of innovation, institutional processes tend to be driven by more rigid and quantifiable outcomes, Schroeder (2007) argues. These misalignments need to be taken into account when setting realistic goals for SoTL-focused projects.

In terms of global levels of SoTL impact, the contributors to Land and Gordon (2013) position SoTL within a wider discourse of enhancement in higher education. In this context, SoTL impact is envisaged as a contribution toward education's overall quality. Poole and Simmons (2013, p. 118) give an example of this, pointing out that Canadian universities that perform highly across SoTL outputs are overall of "higher quality in terms of teaching and learning," based on institutional rankings and other quantifiable measures of teaching and learning activity. The suggested causation may be indicative of SoTL's ongoing contribution to the quality enhancement agenda in Canada. Further studies designed to locate such causations between institutional SoTL-focused practices and higher education's quality outputs on a national level and beyond are needed.

This brief overview of various understandings of SoTL impact reveals an abundance of diverse and at times contradicting ideas about what constitutes impact and how this impact can be measured. The lack of consensus points toward a need for a unified system by which to judge and measure SoTL impact. It is this very need that informs this article's rationale. Below, I offer an in-depth look at different

ways the impact within the field of SoTL can be evaluated, before presenting and analyzing the proposed impact rubric in the context of three projects.

EVALUATING AND MEASURING SoTL IMPACT

Out of a variety of unifying models and conceptual understandings of impact in SoTL, the micro-meso-macro-mega framework first proposed by Simmons (2009, 2016) and since furthered by many others in the field, has seen many applications in varying contexts. In this model, *micro* refers to an individual level of impact, *meso* to a departmental, *macro* to an institutional and *mega* to a disciplinary or national level. Examples of practical manifestations of various levels of impact are provided by Acai, Ahmad, Fenton, Graystone, Phillips, Smith, and Stockley (2018, p. 52): “individual impact may manifest as developments in a teacher’s personal or professional identities while departmental and institutional impact can be evidenced by changes in the policies, practices, and institutional values that inform teaching and learning at a broader level.”

Other approaches to measuring and understanding SoTL impact introduce various matrices and metrics, usually in alignment with main components of SoTL, and driven by a search for causation between various aspects of SoTL and improved learning and teaching. For example, Brew and Ginns’s (2008) index of metrics structures impact analysis along such key components as teaching excellence, scholarly teaching, dissemination, and reflection, while Hoessler, Britnell, and Stockley (2010) propose to position SoTL impact within a matrix informed by such processes as learning from literature, rigorous evaluations of one’s own teaching practices, analyses of one’s findings, and diverse ways of disseminating these findings. Regarding the latter, Trigwell (2013), also concerned with causations in SoTL, found that making scholarly teaching public and subjecting it to peer review was more likely to result in improved student learning.

Determining a key question driving a SoTL-focused project and its evaluation is another way of conceptualizing impact. For example, Kreber and Brook (2001) consider the importance of process questions such as when, why, who, and how and suggest that SoTL scholars look into such measures as teaching performance, student learning, and beliefs about teaching and learning to evaluate impact. Other inquiry focuses on various levels of efficacy of teaching and learning interventions (Bloch-Schulman, 2016; Jaarsma, 2015), while others (Acai et al., 2018; Light, Calkins, & Cox, 2009, 237-270) adopt such concepts as change and development as their primary evaluation criteria. Scholars like Hubball and Clarke (2010) propose using evidence-based improvements to curriculum and course design and student-informed adjustments to teaching and learning processes as main impact metrics.

A great variety of existing approaches to evaluating and measuring SoTL’s impact indicates an increasing complexity in how SoTL is designed, performed and evaluated. However, there is also a concern shared by many that the current rise of accountability and performative narratives in higher education (Locke, 2014) can endanger nuanced, “inquiry-driven, improvement-focused practices” SoTL is known for (Hutchings et al., 2013, p. 35). Hutchings, Borin, Keesing-Styles, Martin, Michael, Scharff, Simkins, and Ismail (2013) further suggest that subjecting SoTL to rigid numbers-driven accountability requirements of output metrics can limit the scope of inquiry, which, ultimately, would harm students.

Acknowledging the above-mentioned constriction (Bloch-Schulman, 2016), even violent (Sutherland, 2015) connotations of the notion of impact, the rubric I propose is offered to reconcile the persisting tension between the deep contextualization of SoTL and the institutional quest for impact.

The rubric also can offer scholars some useful ways of reflecting on their work and using their research findings to articulate academic outputs in a great variety of ways.

The rubric (Table 1) incorporates such types of impact as improved learning and teaching, dissemination of results, and strengthening of institutional profile, with levels of impact ranging from that achieved within an individual classroom to that reaching the global. Metrics proposed to determine the extent of each type of impact can be used as evidence regardless of level of impact analyzed.

Table 1: Rubric for measuring the impact within the field of SoTL

TYPE OF IMPACT	LEVEL OF IMPACT	METRICS
Improved learning (student experience)	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Student satisfaction • Academic achievement and pass rate • Retention rate • Other student self-reported improved experience
Improved teaching (lecturer experience)	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Transformed academic identity • Facilitated reflection practice • Facilitated interdisciplinary exchange
Results disseminated	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Student-centered publications • Publications in discipline-specific outlets • Publications in interdisciplinary outlets • Outputs in industry-linked outlets • Evidence of student collaborations and partnerships • Public engagement outputs (e.g., media, altmetrics) • Collegiate engagement (e.g., interinstitutional, international collaborations,)
Strengthened institutional profile	National International Global	<ul style="list-style-type: none"> • Institutional student ratings of satisfaction • Increased graduation rate

Below I describe how the rubric can be utilized to analyze various streams of impact of SoTL projects.

ANALYZING THE PROPOSED SoTL IMPACT RUBRIC

Context

The three projects used in this study were driven primarily by an aspiration to improve student experience, and each relied on the use of educational technologies to achieve its goals. However, the projects varied by their intended level of impact, ranging from a unit-based, to a course-based and, finally, to an institution-based impact. Each project was completed through collaboration of an evaluator (a SoTL-focused scholar) who worked with the lecturers teaching the units and the learning designers and technologists assisting the lecturers with bringing their SoTL innovation to life. The evaluator's primary role across all three projects was to help lecturers generate evidence of their project's impact and

analyze data collected to either justify funding received or to make a case for a wider implementation of their innovation. All three projects received ethical clearance and resulted in co-authored publications and conference presentations (Oates, Pechenkina, Laurence, Eldridge, & Hunter, 2016a, 2016b; Pechenkina, Lawrence, Oates, Eldridge, & Dan, 2017; Pechenkina, Scardamaglia, & Gregory, 2018; Reid & Pechenkina, 2016; Scardamaglia & Pechenkina, 2015). Finally, the three projects were defined by different contexts and stakeholders, these factors having shaped (and perhaps somewhat limited) each project's design, scope, and evaluation process. However, diversity of these projects is also what makes their selection for the rubric analysis more interesting, as it allows for consideration of different levels and types of SoTL impact.

Project One: Prescribed mobile device experiment (classroom level impact)

Project One was initially conceptualized by a first-year advertising unit's lecturer, who secured an internal grant to undertake a mobile learning trial. The project's primary aspiration was to address the (perceived) disparity in ownership of mobile devices among students and to learn whether student preferences for using their own devices or a prescribed device played a role in how students engaged with mobile learning activities.

"Bring your own device," or BYOD, tends to be the unofficial policy in most higher education institutions and is positioned as an antipode to a policy of a prescribed device, where the institution either loans or gives students personal mobile devices to be used specifically for studies. In Project One, interested students were loaned a Samsung tablet on a first-come-first-served basis due to a limited number (22) of devices available. Study participants were recruited from a larger cohort of students enrolled in an advertising unit throughout 2014-2015. All students, regardless of whether they used loaned or owned devices, were instructed on how to complete various mobile learning tasks. These tasks included perusing discipline-tailored mobile applications such as Feedly, Twitter, Google, ScoopIt, and Flipboard; self-testing via in-class online quizzes; and collaborating in digitally located peer groups.

Upon the conclusion of this mobile learning trial, the project was evaluated via an online survey ($N=22$) and four in-depth interviews with survey participants selected on the basis of their device usage profiles. Limited in time and resources, Project One's research team chose not to utilize observation or other ethnographic methods, instead opting for more time-efficient forms of data collection. As a result, mixed qualitative and quantitative data generated via surveys and interviews allowed the team to discern general trends as well as gain a number of deeper insights into student experiences with mobile devices uses for learning.

Presented as a co-authored peer-reviewed conference paper (Reid & Pechenkina, 2016), the project's findings showed that all students involved in the trial already owned at least one mobile device and that their mobile technology preferences (a preference for a particular brand or type of device and operating system) were instrumental in determining their perception of how fit for purpose a prescribed device was. In fact, students' existing device ownership was a deciding factor in how they engaged with mobile learning tasks the lecturer introduced in the classroom. Students who took part in the loaned device trial demonstrated simultaneous and complementary usage patterns, utilizing all available devices at their disposal at the same time but for different learning purposes.

Ultimately, students' immediate needs, the nature of a learning task, and technology usage habits all factored in defining how students engaged with mobile learning activities during this trial. Overall, students reported they did not think they acquired new learning skills as a result of this project. Students

also wished there was more guidance and instruction involved in shaping their engagement with mobile learning tasks, regardless of device used.

This project was designed as a one-off trial with no funding available to continue beyond the trial. Data collected as part of the evaluation was to be used to justify the seed funding this project received from the university. Using the proposed rubric, the project's various types of impact can be considered as follows (Table 2):

Table 2: Analyzing impact of Project One

TYPE OF IMPACT	LEVEL OF IMPACT	METRICS	IMPACT ANALYZED FOR PROJECT ONE
Improved learning (Student experience)	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Student satisfaction • Academic achievement and pass rate • Retention rate • Other student self-reported improved experience 	Localized within the advertising classroom, the accomplished mobile device trial arguably did not lead to improved student learning. Student perception being at the core of this evaluation, the study however still produced some useful insights into how students engage with mobile learning technology. However, any impact the trial could have had on student grades or satisfaction was not measured as it was considered outside of the study's scope. Such an impact would have been unlikely, given students' mixed reception of the trial.
Improved teaching (Lecturer experience)	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Transformed academic identity • Facilitated reflection practice • Facilitated interdisciplinary exchange 	Measured informally via collegial reflection, the lecturer's reflexivity increased as he reported becoming more aware of the variety of complex factors affecting student learning behaviors, in particular where the uses of educational technologies are concerned.
Results disseminated	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Student-centered publications • Publications in discipline-specific outlets • Publications in interdisciplinary outlets • Outputs in industry-linked outlets • Evidence of student collaborations and partnerships 	Data collected was presented at conferences and published as a peer-reviewed conference paper. These dissemination outlets were interdisciplinary, allowing the lecturer to discuss the findings' applicability beyond the discipline of advertising. The findings were also promoted via such online non-peer-reviewed platforms as Academia.edu, ResearchGate, LinkedIn, and Twitter, all of which resulted in a significant number of downloads, views, reads,

		<ul style="list-style-type: none"> • Public engagement outputs (e.g. media, altmetrics) • Collegiate engagement (inter-institutional, international collaborations, etc.) 	and shares, suggesting wide interest in the topic.
Strengthened institutional profile	National International Global	<ul style="list-style-type: none"> • Institutional student ratings of satisfaction • Increased graduation rate 	Arguably, these metrics have not been achieved as the study was short-term and simply did not last long enough to allow for more global and sustained types of impact.

Based on analysis, this project did not achieve its intended goals of addressing mobile ownership disparity or increasing mobile learning engagement among students. While all prescribed devices offered to students were taken up and students did use them for learning purposes as instructed, the evaluation showed that students did not believe they learned any new skills or benefited in any significant way from being loaned a tablet device for learning. Similarly, the project's impact on teaching was minimal, as the lecturer decided not to pursue the mobile learning activities beyond the trial, following a mixed student reception and limited resources. It is possible this project achieved some individual-level impact, however: while it was decided not to continue with this mobile learning endeavor in this particular classroom, the lecturer and others involved in the project learned some valuable lessons pertaining to student learning and device usage, which on its own could be considered impactful.

Perhaps, the project's most significant impact was unintended, going beyond the confines of the classroom, institution, or the discipline. As the question of BYOD or prescribed mobile device topic is a topical issue for educators and policy makers alike, their interest in Project One's outcomes was higher than expected, as evidenced by the number of engagements with the findings from international academic and professional communities. For instance, Academia.edu analytics collected for the period of September to December 2016, when the published conference paper was first uploaded, showed that the paper was the most downloaded piece of research on both authors' profiles, counting 46 downloads and 76 all-time views, with another 32 users bookmarking the paper for future reading.

All Academia.edu users who read or download research are required to supply a reason for their action, and this information is made available to the authors of said research via the platform. Various reasons that users supplied for reading and downloading the paper in question generate further insights into the project's impact. The three primary types of readers engaging with the paper were as follows:

1. Those with a general interest in the BYOD/prescribed device debate and mobile learning broadly
2. Secondary education practitioners in the process of implementing a BYOD policy in their school
3. University lecturers wishing to use the paper as reference material in their teaching which already uses or plans to use mobile learning activities.

For example, one user who downloaded the paper said "we are a 1-1 school district that requires students to rent our laptops. We are investigating going to BYOD," while another explained that they "have been looking at mobile learning here at [college]—and will even be running a Mobile

Communications unit as part of our new degree course.” Such comments and downloads came from such countries as Argentina, Australia, Bahrain, Canada, Hong Kong, Thailand, Russia, and the United States, indicating an international reach of dissemination.

Such alternative metrics (or altmetrics) generating platforms as Academia.edu may present an additional way of measuring impact (Downie, 2016). Specifically related to SoTL impact, these altmetrics can be data-mined to better understand wider-ranging effects and applications of SoTL initiatives. As in the case of Project One, limited altmetrics available via Academia.edu have already generated some insights into the varied motivations of those interested in the topic of BYOD versus prescribed device and their planned use of these learnings in their professional contexts. While limited, this information can be expanded and analyzed in a greater detail, with conclusions made about a potential reach of any given SoTL project. Altmetrics can also be embedded into a scholar’s academic narrative when making a case for a tenure or promotion as a way of showing the reach and impact of one’s scholarly teaching (Cabrera et al., 2017). This way, while digital altmetrics can be used as evidence of global types of SoTL impact, they can also perform as evidence of individual academic impact.

Project Two: Evaluating student experience in a multi-element blended law offering (discipline wide impact)

At the center of Project Two was a multi-element blended learning design piloted in one unit within a new Bachelor of Laws program. Based on the success of this trial, as judged by students and lecturers’ reception, this design was then implemented at the course (discipline) level. At the time of writing this article, a second unit within the course was being redesigned, using the same blended format. A peer-reviewed co-authored article about this study was recently published in an educational technology journal (Pechenkina et al., 2018).

The design and structure of the trialed blend’s key elements was informed by law’s signature pedagogy (Shulman, 2005) and purposed with assuaging students’ memorization activities associated with information-heavy learning in law. Such teaching and learning tools as summary videos and digital self-assessment quizzes were implemented to facilitate student reflection and complete the review cycle. At the same time, an add-on design element of digital discussion boards was also included in the blend, as it had been used with some success in other projects (Hwang & Arbaugh, 2009; McCarthy, 2010; McGee, 2014).

Project Two’s evaluation was guided by an exploratory case study methodology (Yin, 2013) that combined focus groups (eight student participants) and online surveys (two cohort-based surveys administered, with 12 student participants in total). Data collection aimed to gauge how students experienced the unit’s blended elements and identify what was working well and what needed improvement. As research on blended learning tends to be dominated by large-scale quantitative studies (Sen, 2013; Vo, Zhu, & Diep, 2017), it was decided to employ smaller-scale qualitative methods to generate in-depth cohort specific insights rather than widely generalizable findings. Administered across three subsequent cohorts of students in this unit, the evaluation attracted 20 student participants (one-third of all students enrolled throughout the period).

Data was analyzed for recurring themes and triangulated with the unit’s end-of-year student satisfaction data and final academic results for each of the three student cohorts participating in this study. While students were overwhelmingly positive about the unit’s discipline-specific blended

elements, specifically attributing their improved comprehension of “dry” law content to summary videos and self-test quizzes, they did not widely use general add-on design elements like discussion boards.

The findings helped confirm a hypothesis that the blend’s elements designed with the discipline’s pedagogy in mind were more suitable for technology-enabled student learning than were the generic blended elements. Overall, across all three cohorts of students participating in the project, the unit achieved some of the highest academic performance and student satisfaction rates in the university. However, as the unit in question was designed from scratch (as opposed to being a revision of an established design), student outcomes and perceptions could not be analyzed on a before/after continuum. Using the rubric, the project’s impact can be considered, as follows (Table 3).

Table 3: Analyzing impact of Project Two

TYPE OF IMPACT	LEVEL OF IMPACT	METRICS	IMPACT ANALYZED FOR PROJECT TWO
Improved learning (Student experience)	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Student satisfaction • Academic achievement and pass rate • Retention rate • Other student self-reported improved experience 	<p>This blended design was positively perceived by students. Students reported using the unit’s online elements for review and revision, even crediting these tools with their overall success in the unit. While students’ high pass rate and above average satisfaction with the unit reported in the end of the trial period can be attributed to the unit’s discipline-focused blended design, other contributing factors were not considered (e.g., students’ drive and strong motivation to succeed). Following the success of this trial, this blended design was adopted in other units across the law program, signaling an inter-classroom and discipline-wide impact.</p>
Improved teaching (lecturer experience)	Local/classroom Inter-classroom Discipline-wide/global Interdisciplinary/global	<ul style="list-style-type: none"> • Transformed academic identity • Facilitated reflection practice • Facilitated interdisciplinary exchange 	<p>The unit’s head lecturer publishes her academic outputs exclusively in her specializations in legal studies. However, following the blended learning pilot and co-authoring an article about it, she acknowledged that participating in the project helped her reflect on her teaching practice and inspired her to take better advantage of digital learning affordances of blended designs.</p>
Results disseminated	Local/classroom Inter-classroom Discipline-wide/global Interdisciplinary/global	<ul style="list-style-type: none"> • Student-centered publications • Publications in discipline-specific outlets 	<p>Preliminary findings were presented at a university-wide conference and at law faculty’s staff professional development workshops. A co-authored peer reviewed article has recently been published in an educational technology journal and is currently being promoted across various</p>

		<ul style="list-style-type: none"> • Publications in interdisciplinary outlets • Outputs in industry-linked outlets • Evidence of student collaborations and partnerships • Public engagement outputs (e.g. media, altmetrics) • Collegiate engagement (inter-institutional, international collaborations, etc.) 	non-peer-reviewed social media outlets and altmetrics platforms.
Strengthened institutional profile	National International Global	<ul style="list-style-type: none"> • Institutional student ratings of satisfaction • Increased graduation rate 	None to date, as the first intake of law students in this program has only recently graduated. However, the university's law program overall is rising in its national profile as recent news coverage suggests.

As the analysis shows, this project's primary impact has encompassed immediate benefits to student learning. Student participants reported using the unit's blended elements to review, revise, self-test and consolidate their knowledge. The study also helped clarify the importance of relying on a discipline's signature pedagogy when designing blended units, presenting a type of disciplinary SoTL research that has useful implications across disciplines and classrooms. The project's preliminary findings have been presented at a local conference, and a research paper was recently published.

Project Three: Using a mobile app to enhance student engagement (interdisciplinary level impact)

Initially funded by a university seed grant, a mobile application was designed to increase student engagement in a first-year accounting unit known for high attrition rates. Drawing on Werbach and Hunter's (2015) gamification toolkit, the app was created to engage students in lecture content by delivering a series of multiple-choice content-focused quizzes directly to students' personal mobile devices after the lecture and before the tutorial. Grounded in the pedagogy of spaced education (Kelley & Watson, 2013) and Ebbinghaus's (2013) theory of the forgetting curve, the application was envisaged to scaffold learning and increase retention. Following the first phase of the accounting unit pilot, the app was taken up by a first-year sciences lecturer. Further, the app, made customizable, is currently being piloted at the university level, with cross-university and international trials at early stages.

Due to limited time, funding and resources, it was decided that as a first evaluation step, there would be a quantitative statistically driven study into the app. The pilot participants were sourced from cohorts enrolled in the first-year accounting and sciences units in semester 2, 2015. Of 462 accounting students, 265 (57 percent) opted to use the app, and of 249 sciences students, 129 (52 percent) opted to

use the app. Average grades and retention rates for pre-pilot cohorts (semesters 1, 2015 and in both semesters of 2013 and 2014) were assessed for comparison with app-using cohorts. After first planning to compare student outcomes between accounting and sciences cohorts, it was soon decided to combine these into one sample to ensure statistically meaningful outcomes. Hence, of the combined sample of 711 students, 394 (55 percent) were app users who consented to have their app engagement data collected for research purposes.

To measure the app's impact on student outcomes, a statistical analysis was conducted using IBM SPSS Statistics to determine Pearson correlations between app-using cohorts and pre-pilot cohorts. App-specific data sets included numbers on frequency and timing of correct quiz answers. Average grades and retention information were also collected (see Pechenkina et al. [2017] for further details on the study's methodology, including its strengths and limitations). Statistical analysis registered an increase of 12.23 percent in retention rates of the app-using cohort while improved academic performance correlated positively with the app's usage. These initial findings informed trials in other disciplines and universities. Aside from presenting this research at several conferences, a co-authored paper was published in a highly regarded educational technology journal, which has resulted in extensive media engagement via commissioned guest blogging and syndicated coverage.

Using the rubric, the project's impact can be considered (Table 4).

Table 4: Analyzing impact of Project Three

TYPE OF IMPACT	LEVEL OF IMPACT	METRICS	IMPACT ANALYZED FOR PROJECT THREE
Improved learning (Student experience)	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Student satisfaction • Academic achievement and pass rate • Retention rate • Other student self-reported improved experience 	Local and inter-classroom impact achieved, as evidenced by app-using students' increased academic performance and retention rates. As this was a quantitative data driven study, student satisfaction was not considered as part of its metrics. However, informally it was reported that students spoke favorably of the app in their end-of-semester evaluations. Given the app's extended trials, encompassing other disciplines and universities, the potential for global and interdisciplinary impact is strong, though it remains to be measured and interpreted.
Improved teaching (Lecturer experience)	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Transformed academic identity • Facilitated reflection practice • Facilitated interdisciplinary exchange 	An experience of co-authoring an article allowed for in-depth reflections on teaching practice and mobile learning designs by all involved in this project. However, while this impact is interdisciplinary and inter-classroom, it remains informal.

Results disseminated	Local/classroom Inter-classroom Discipline-wide Interdisciplinary Global	<ul style="list-style-type: none"> • Student-centered publications • Publications in discipline-specific outlets • Publications in interdisciplinary outlets • Outputs in industry-linked outlets • Evidence of student collaborations and partnerships • Public engagement outputs (e.g. media, altmetrics) • Collegiate engagement (inter-institutional, international collaborations, etc.) 	The co-authored article was published in an open access journal and promoted by the journal's media office, resulting in guest blogging opportunities and syndicated pieces reaching international audiences. As a result of the article's extensive dissemination, several lecturers in universities outside Australia reached out to the authors to articulate their interest in piloting the app.
Strengthened institutional profile	National/international/global	<ul style="list-style-type: none"> • Institutional student ratings of satisfaction • Increased graduation rate 	While it cannot be claimed that the app singlehandedly resulted in the increased university-wide student satisfaction or graduation rates, media impact following the article's publication did place the research and the university in the news discourse for several weeks immediately following the publication.

CONCLUSION

Grounded in the complex body of SoTL-focused research, this study proposed a synthesized rubric by which to judge and analyze SoTL impact. The rubric was applied to three recently completed SoTL projects, each of which was analyzed for various types of impact, desired, achieved, or not achieved. All projects were completed at the same university, and all were accomplished through a collaboration of lecturers, learning designers, and an independent evaluator. While each project piloted a different technological innovation in teaching and learning, all three shared a goal of enhancing the student learning experience.

Out of three projects analyzed, Project One arguably did not achieve its set goals of improving student learning, since participating students did not report or demonstrate acquisition of new mobile learning skills; neither did they engage in a meaningful way in the mobile learning activities introduced as part of the pilot. However, disseminating Project One's findings produced some unexpected outcomes, specifically those concerned with external engagement, as measured via altmetrics. That the project did not achieve its goals of improved learning could be due to such factors as the project's limited scope and design and its hypothesis that students would benefit from having access to loaned mobile

devices to use for some mobile learning tasks being introduced into their curriculum. However, not achieving its desired classroom impact does not necessarily cancel out the fact that this project fared well in terms of dissemination-based impact. The rubric analysis helps to reveal these unexpected types of impact. Further, if a SoTL project does not achieve what it intended to do in the classroom, it does not mean that others cannot access the lessons learned from the effort and apply those in other contexts, perhaps with success. This indicates the importance of SoTL dissemination, regardless whether a project is considered a success or failure: findings can prove useful to various audiences within and outside of academia, and this could lead to applications in other contexts.

Analysis of Project Two demonstrated significant engagement from participating students, who reported utilizing the unit's online elements for review and revision, and even credited these with their ultimate success in finishing the unit. However, while students' overall high rates of completion and levels of satisfaction can be attributed to the unit's discipline-focused blended design, other possible factors of students' success were not considered. Ultimately, though, the uptake and adoption of this unit's blended design across the entire law program signaled inter-classroom and course or discipline-wide types of impact achieved. Regarding impact on teaching, the unit's lecturer acknowledged that participating in the project inspired her to rethink some of her teaching strategies and to take advantage of various digital allowances afforded by blended learning.

Project Three was the only one among the three studies that specifically endeavored to quantify an improvement to student outcomes by correlating students' app usage with positive changes in their academic performance and retention rates. This was accomplished by comparing certain metrics between pilot and pre-pilot cohorts. The project's extensive dissemination was credited with an unexpected type of impact achieved when other universities reached out to participate in the app pilot. This indicated a type of impact that transcended the immediate classroom and the confines of one institution.

Using the rubric to analyze various types of impact these three project achieved or did not achieve allowed for an initial testing of the rubric as a tool that can be of service to lecturers, collaborative teams, and institutions, regardless of contexts and agendas. This need for a comprehensive framework emerged out of complex body of scholarship dedicated to measuring SoTL impact, and various tensions existing between different types of impact, namely those that are easily quantifiable and those less obvious ones that oftentimes remain hidden. The purpose of analyzing these three SoTL projects was therefore twofold: to accomplish the preliminary testing of the rubric to make decisions around its feasibility and to contribute to an ongoing discussion of SoTL impact.

Testing and refining the proposed SoTL impact rubric is a work in progress, with more studies needing analysis against the rubric to further refine it. The three projects featured in this study were selected because they were all conducted at the same university and in collaborative teams, with the evaluator being the common denominator. The projects varied in their scope, design, data collection plan, resources, and funding available, but all were driven by the shared goal of improved student learning. It is possible that some of these projects performed better than others across some types of impact because they had more sophisticated designs and better articulated goals. However, the rubric's design does not privilege one type of impact over another; neither does it claim that SoTL projects that have achieved impact on multiple levels are in some way better than those demonstrating impact on one or two levels only. Rather, the rubric provides a tool that helps SoTL scholars consider every possibility as well as every gap of a project. As the reviewers of this article pointed out, when using the proposed

rubric, it is important to take into account that different SoTL projects have different aims and goals, and the desired impact must be judged against those, first and foremost. It also needs to be acknowledged that using the rubric to analyze SoTL impact may also reveal that no change or intervention is necessary or that an intervention had a negative effect on student learning. In such a scenario, rubric can still be used to better understand what was done and to foster deep self-reflection among SoTL practitioners.

As a reviewer of an earlier version of this manuscript rightly pointed out, the rubric focuses primarily on the “what works” question (Hutchings, 2000). Thus, it is important to acknowledge other types of SoTL inquiry (Bloch-Schulman, 2016; Jaarsma, 2015) so that in future iterations the rubric could thus be extended and tested for its applicability to other types of SoTL inquiry, such as projects focusing on the nature, contexts, and various conditions of learning or projects seeking to develop theory in SoTL. The question of what types of metrics would be most appropriate for these kinds of studies remains open. Further, metrics proposed in the current iteration of the rubric are not exhaustive, but rather suggested examples and possibilities of what metrics could be. For example, there could be other types of a changed experience that have to do with improved equity, equality, or inclusion dynamics within a classroom. Once again, metrics would need to be fine-tuned to ensure alignment with a specific project’s aims and goals.

Returning to the overarching question of whether a wider SoTL impact that reaches far outside the classroom is possible or relevant, the answer is yes to both, on the condition of long-term planning, dedicated time, and resources, as well as mindful collaboration between stakeholders and ongoing institutional investment and commitment. In particular, multi-stakeholder collaboration as a factor of SoTL impact needs further emphasis. All three projects featured in this article were accomplished as multi-stakeholder collaborations, with all stakeholders contributing to different aspects of a project and disseminated findings via diverse channels. The perseverance and motivations of all stakeholders also factored into the process of making each of these projects impactful, each in their own right.

However, it is important to acknowledge that another factor affecting the success of creating impact is chance—and chance is difficult to predict or design for. A SoTL project’s outcomes accomplished and disseminated at the right time to the right audience can strike a chord, leading to a much bigger impact than anticipated. At the same time, a carefully thought-through multilevel dissemination strategy can have very little impact in an unreceptive environment. While the proposed rubric is intended as a guide, it is useful to keep in mind that sometimes even the smallest of innovation and change in one’s classroom can lead to the most significant outcomes.

My analysis inspired the following questions that SoTL scholars should consider when conceptualizing, designing, and evaluating their projects. If asked early on in the process, these questions can help shape SoTL projects in a way that increases their chances of immediate and long-term impact:

- What aspects, if any, of student experience need to be improved? How will outcomes best measured?
- Which stakeholders need to be involved? Is this project best achieved as a collaboration?
- What are desired outputs and implications for different stakeholders? What can each stakeholder bring to the table to achieve impact?
- What are dissemination channels for this initiative and what metrics, traditional or alternative, can be used to judge its effectiveness?
- Is this project sustainable? What resources are available to achieve sustainability?

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