

The Development of a Framework for the Effective Translation of Educational Research into Sustained Practice in Singapore

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SINCE 2009, RESEARCH-TO-PRACTICE translation has emerged to become an increasingly important agenda for the Ministry of Education and the National Institute of Education (NIE). At the NIE, the first funding cycle yielded the fruition of many design-based research projects. These projects have been demonstrably successful in their original schools of implementation and, therefore, would be of benefit to policymakers and grant-funding agencies to understand how the deliverables from these projects might be translated into wider practice in a diversity of educational settings relevant to the Singapore context. The central focus of this research study was to develop a framework to understand how the outcomes and programmes arising from researcher-driven interventions may be extended and scaled into wider practitioner-driven enactments, in the context of the education system in Singapore.

INTRODUCTION

This project arose from the need to engage in translation and scaling efforts from previous technologically mediated research projects. The concepts of diffusion, scaling and translation are contested, and are sometimes framed too narrowly from the paradigm of numbers progressing along a uni-linear trajectory alone. To an extent, this paradigm arises from how translation has been understood from the bioscience and pharmacological industries. Transposing these understandings to the Social Sciences in general, and to Education in particular, has not been straightforward.

KEY IMPLICATIONS

In extension and scaling, deliberate efforts should be made towards seeding for a research-practice community as a structure to engage the participants with the various context-instantiations. We have found that effective strategies to enculturate people include:

- Involving stakeholders in co-analysis and co-design from the start
- Establishing shared language and understandings through boundary objects (design artefacts)
- Seeding and incubating a community of researchers, practitioners and brokers to augment translation

Because of the pressing need to enact translational work for both FutureSchools (FS) and eduLab projects and also potential Centre for Research in Pedagogy and Practice's Learning Sciences Lab curricular innovations, a framework to inform decision making and policy formulation is critical. Using one of these projects—the eduLab Six Learnings project—as a test-bed, we have sought to:

- determine how the design principles and theories, which have informed the original research project, can be subsequently scaled; and in the process, develop a framework for translation, which involves detailed understandings into the breadth and depth of the specificity of outcomes resulting from the research; and
- assess whether there is sufficient preparedness in the schools in terms of teacher-readiness for scaling to occur. The latter is important largely because lethal mutations from the original intentions usually occur if those who take up the interventions do not understand the conceptual underpinnings of the research innovation.

In 2012, data from teacher enactment of lessons designed using the Six Learnings curricular framework (Lim, 2009) were collected to help us understand the process of effective translation of a curricular innovation in local schools. We explored how teachers in different schools and different levels appropriated the Six Learnings curricular framework in their classrooms, and discussed the kinds of support to be provided to teachers.

In our study, we have chosen to stress the importance of people and stakeholders as a key dimension in successful translation efforts. By arguing for a community-based approach to augment translation efforts, we have proposed and justified a social participatory process complementing the traditional product-oriented scaling models. We see this as another significant contribution of this study to the literature. We frame such a community as central to the success of recreating resemblances and legitimate mutations relative to the original research innovation.

RESEARCH DESIGN

Traditionally, the extending and scaling of research innovations in education has been viewed through the lens of multiplication (increasing numbers) and spreading (increasing areal reach). In *Diffusion of Innovation* (Rogers, 1964), innovation is defined as any new idea, practice or object, and innovation diffusion is measured in terms of the number of innovation adopters over temporal, social and spatial

dimensions. Such a view of innovation-scaling is therefore, product-oriented, in that the deliverables (performance indicators) of successful “scaling” are defined according to strict numeric constructs (e.g., the number of teachers, the number of schools, the number of school clusters, etc.). Another limitation of product-oriented innovation-scaling theories, such as *Diffusion of Innovation*, is that the process (rather than factors) in which pre-adopters make transitions through their participatory involvements in the community has not generally been the focus of investigation.

An often implicit assumption of this view is that these innovation “products” are replicable en masse without undergoing (and without the need to undergo) significant change from the original. Such a view of scaling stems from a 20th century Fordist-production paradigm (as applied to traditional notions of Instructional Design), and there are numerous examples of such an interpretation which can be cited from within the Singapore school system. Such views are challenged by alternative paradigms such as *Communities of Practice* (CoP), in which social and contextual dimensions and people-activity interdependencies are foregrounded, thus supporting a process-oriented perspective. Such processes are enacted through shared codes of conduct, histories and cultures (Wenger, 1998).

It is our contention that 21st century learning and literacies demand a fundamental rethink of such a framing of innovation-scaling. We echo Latour (1993) in proposing a more nuanced, situative view of innovation-scaling—one which explicitly foregrounds the local contextual factors and interplays within which all iterations from the original are embedded. To elaborate, a shift needs to be made from the strict multiplicative metaphor to what we term a *resemblance metaphor*. We argue that inherent in such a resemblance metaphor is the explicit recognition that the extension and scaling of innovations arising from education-research is just as much a process as it is a product; and because innovation-scaling is a process, it is by definition not processes to be replicated, but instead to be recreated/reinstated/reenacted. Such instantiations and enactments take place in the milieu of the products of the innovation, namely artefacts and boundary objects. The latter form the substrate from which the dialectical interactions between product, process and participant-practitioner are lived and therefore reified. Going forward, it is our strong conviction that such a framing of the extension and scaling of innovations will inform the direction of many education-research interventions in Singapore. Hence, subsequent reinstatements from the original are not reproductions but recreations which have resemblances to the original.

Qualitative data were used to gain a holistic vision of curricular implementation. At least one researcher attended each class during the use of the curriculum and conducted observations. During each class, the researcher also set up a video-recorder at the back of the class to video-record the class proceedings. The data collection was focused on issues of how the teacher and the students used the immersive technologies and, in particular, how the teacher facilitated the class discussions following students' work. Pre- and post-interviews with the teachers were conducted in order to understand their intentions and beliefs to deliver inquiry-based learning. The researchers used observations, interviews and analysis of artefacts created by students in the immersive environment to triangulate emergent understandings (Lincoln & Guba, 1985).

Following data collection, the researchers organized and compared the teachers' enactments of the lessons with the intention of studying how and why teachers interpreted and enacted lesson units designed from a unifying framework in diverse ways, as they tried to surface the emergent intuitions of learners for subsequent dialogue and deconstruction.

KEY FINDINGS

In our observations of micro-cultures, we first found that, in order not to fall back on instructivist and teacher-centred approaches, teachers need to redesign lessons such that teacher-talk as a default practice is minimized and teacher-facilitation is maximized. In this sense, a rich task design in which students can investigate, inquire, discuss, perform functions in roles, collaborate, and interrogate, including that of justifying and defending positions, is important. Teachers typically do not have the skill set for such task designs. This expertise needs to be developed. In addition to task design, teachers also need to design appropriate follow-up activities in which students are productively engaged. In other words, the pedagogy for such process-oriented 21st century learning has to be learned through teacher practice and performance, and not just learning about the theories of learner-centred philosophies. Teachers need sufficient confidence in executing these pedagogies. This is consistent with the efforts made on teachers developing "funds of knowledge" in students' lives and in wider communities.

Second, leadership support and intelligent leadership were crucial. When school leaders are enlightened and resourceful—that is, when they recognized that students' learning went beyond preparing

for the examinations—they were able to take the appropriate measures in enabling time, space, and resources to be given to their teachers. A strong degree of trust is to be accorded to their teachers as they experimented alongside the researchers. As there is only so much a principal can give in terms of opportunities to have a lighter teaching load as they structure for a greater latitude in research-cum-innovation efforts, teachers involved need to be responsible, professional and sensitive to the overall performance requirements at the levels of both the individual and the school.

Third, teachers who were dissatisfied with the status quo, who were already curious about the promises of learner-centredness, and who were passionate about their students' learning were the ones who achieved productive and fulfilling professional relationships with our design-based researchers. These teachers were motivated to learn in a professional manner. Such observations were especially evident in game-based learning micro-cultures.

Fourth, the professional development of teachers is a critical aspect for the success of a micro-culture. The entire design research journey is an experience in professional development. Because of the journey taken to enact 21st century practice, teachers who are engaged in this kind of design research have to study and understand issues relating to design, pedagogy and assessments. The learning experiences of teachers are authentic because their experiences are contextualized and grounded in practice and experience. The teachers who attended professional development classes at the university were found to understand the issues at hand more deeply. Within schools and at the level of school-clusters, teachers also participated in professional learning communities (PLCs) and CoP initiatives; and through these activities and associations, their professionalism deepened. More can be done to align PLCs and CoPs to the particular interventions practised in the respective schools. As such, school leaders need to take the initiative to align the many learning efforts and journeys in ways that teachers can focus their efforts coherently, conjoining doing-the-craft and reflecting on experience.

Fifth, assessment and curricular goals need to be aligned. In many instances of process-oriented work among students, discourse data, process and outcomes in project work, journal logs, quality of work and participation, and other reifications are assessed.

The limitations to date are that metrics for large scale uniformity of assessment for such practices have not yet been accepted by the system and the public.

Finally, alongside pedagogy is the need to redesign the curriculum and recognize the need to develop dispositions beyond content knowledge to be consistent with the pedagogies advocated. As and when appropriate, topics in the established curriculum might be combined or integrated. Traditional class periods may also have to be reorganized to fit into the more project-based inquiry approaches. We found that for a more sustainable practice change, there needs to be more pervasive redesign at the level of the curriculum unit. For instance, within syllabuses in Singapore, the theme of water is revisited continually and is introduced at primary Science and Social Studies. Hence, a micro-culture would ideally require a sufficient breadth of

topics to be considered with a view to designing an authentic learning experience.

This programmatic model of scaling can be represented diagrammatically in Figure 1. The Six Learnings/Disciplinary Intuitions programme is now at a critical level of scale and would greatly benefit from the assistance of officers from divisions such as the Curriculum Planning and Development Division at the Ministry of Education to take it to the next level.

IMPLICATIONS

For Policy

A community of researchers, practitioners and brokers needs to be established to augment translation. The scalability of a certain research project could be pre-evaluated with consideration of several aspects including design principles, prospects of adoption and adaptation, among others. The NIE can undertake research to further understand the scaling process, particularly in cases where the initiatives are emergent and practitioner-driven.

For Practice

For the purpose of educational scaling, curriculum design needs to be participated and customized by the teachers from different schools while the core principles of the curriculum are kept by grounding curriculum frameworks within theories of learning (as shown in Figure 1).

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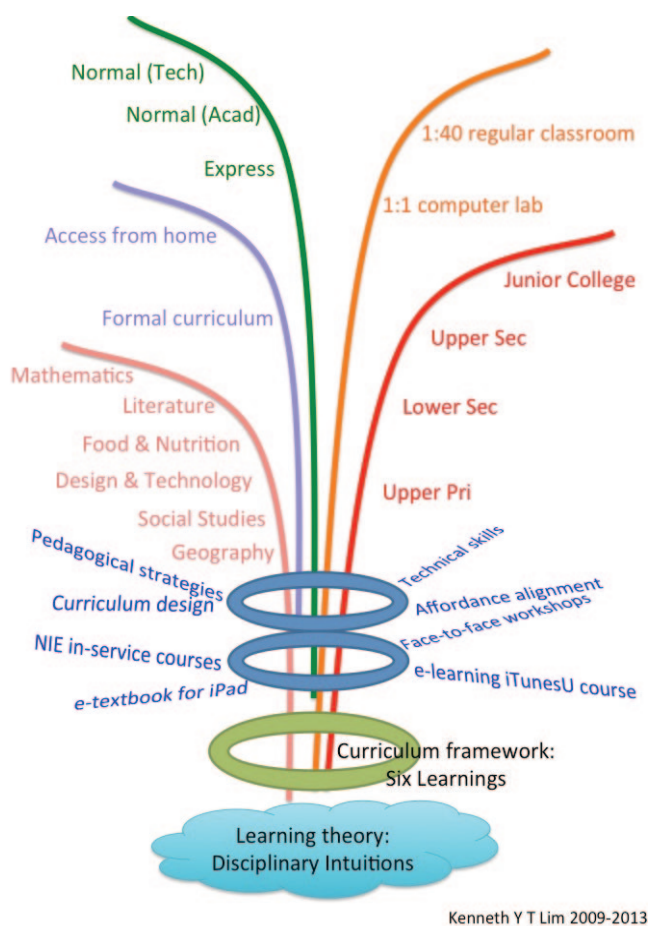


Figure 1. Scaling the Six Learnings/Disciplinary Intuitions programme.

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