# BUILDING A CULTURE OF PEDAGOGICAL INQUIRY: INSTITUTIONAL SUPPORT STRATEGIES FOR DEVELOPING THE SCHOLARSHIP OF TEACHING AND LEARNING

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*The scholarship of teaching and learning (SoTL) can lead to many campus-wide benefits with the help of viable institutional support mechanisms. Educational leaders who are seriously considering the development of an institutional support structure need to strategically plan how to make the best use of limited resources to best integrate this kind of program into their existing educational milieu. What are the classroom-based and institutional benefits of developing a SoTL program? How do post-secondary institutions initiate the development of scholarship of teaching and learning programs? What kinds of institutional support strategies matter? What specific steps can institutions take to put meaningful support structures into place? This article explores answers to these questions by examining the scholarly literature related to the various kinds of supports available to educational leaders for effectively supporting and sustaining faculty involvement in the scholarship of teaching of learning. A typology of support structures is presented that is designed to help guide decisions on how to get started in supporting the development of a SoTL program. The paper concludes with an exploration of institutional change concepts pertinent to the development of a culture of institutional support for the scholarship of teaching and learning.*

## INTRODUCTION

Engagement in the scholarship of teaching and learning (SoTL) can be a powerful tool for both individual professional development and institution-wide academic growth. Deriving institution-wide benefits from the participation of faculty members in formal SoTL projects does not always automatically happen (Schroeder, 2007) but requires a strategic process of determining which support strategies will lead to the greatest institution-wide benefits and how to successfully put these into place within the organization. First, this paper reviews the kinds of classroom and institution-wide benefits that can be derived from effectively supporting SoTL's development and implementation. Then, a typology is presented that serves as an organizer for the board range of support strategies available to academic leaders that might help guide decisions on how to get started in supporting the development of a SoTL program or increase the likelihood of its long-term sustainability. Finally, the paper concludes with an examination of the institutional change concepts related to the development of a culture of institutional support for the scholarship of teaching and learning.

# CLASSROOM-BASED BENEFITS OF THE
# SCHOLARSHIP OF TEACHING AND LEARNING

There is an abundance of academic literature noting the virtues of engaging in meaningful and systematic inquiry into one's own teaching practices and its impact on student learning. Previous research has identified classroom-based benefits that can be classified into six broad categories. First and foremost, engaging in scholarship of teaching and learning (SoTL) research can lead to an improved understanding of student learning, increased learning outcomes for students, higher student expectations and higher standards of attainment (Cox, Huber, & Hutchings, 2004). Savoury, Burnett and Goodburn (2007) suggest that evidenced-based classroom inquiry can lead to the more rigorous documentation of student learning that helps to inform key instructional decisions.

One of the key reasons why faculty members opt to engage in SoTL is the opportunity to have a closer and more rigorous examination of their approaches to teaching. This systematic and evidence-based perspective leads to benefits associated with the second category—those related to improved teaching methods and approaches. SoTL inquiries can provide more awareness of what is taught and how teaching occurs that can lead to modifications to instructional practices, approaches to assessment, and changes to the design of courses (Cox, Huber, & Hutchings, 2004; Weimer, 2006).

Thirdly, participation in SoTL projects can lead to increased excitement about teaching. Experienced SoTL scholars report that exploring questions of interest about student learning, the solving of meaningful educational problems, having a positive focus for change  can help reinvigorate their interest and enthusiasm in teaching, especially after teaching the same courses for long periods of time (Foreman-Peck & Winch, 2010; Weimer, 2006; Cox, Huber, & Hutchings, 2004). SoTL scholars also report that involvement in SoTL inquiries has resulted in increased collaborations with students that often lead to the co-creation or shared creation of learning activities and experiences (Hamilton, 2007).

The fourth type of benefit relates to enhanced professionalism. For instance, a number of authors have suggested participation in SoTL can result in a deepening of reflective capabilities that link theories and practices of teaching (Foreman-Peck & Winch, 2010; McKinney, 2007; Savoury, Burnett, & Goodburn, 2007) and connect  current teaching practices to an established body of research (Cox, Huber, & Hutchings, 2004). Furthermore, systematically reflecting on their own practice enables instructors to take a more objective and self-critical stance towards their own approaches in teaching (Weimer, 2006); to be open to critique and the analysis of their teaching practice (Trigwell & Shale, 2004); and to promote their own transformative learning (Hamilton, 2007; Hutchings, 2004). In fact, Foreman-Peck and Winch, (2010) argue that taking an evidenced-based approach to one's own teaching practice serves as a proactive response to the increasing pressure from new institutional measures of accountability, including the recent implementation of national and institutional standards of professional conduct of teaching as well as the implementation of new faculty training and development frameworks in several jurisdictions. It can also contribute to the attainment of professionally-oriented rewards and recognition by providing helpful information for annual merit reviews, tenure and promotion decisions, teaching award competitions, and department/program reviews (Savoury, Burnett, & Goodburn, 2007).

The fifth category of benefits relates to the opportunities faculty members have to increase and broaden their research proficiency by framing researchable and insightful questions, trying out new methods of gathering meaningful data, developing workable and practical strategies to make sense of the results, and sharpening their writing skills (Foreman-Peck & Winch, 2010; Hamilton, 2007). Healey (2003) also suggests that the increased research literacy through SoTL involvement also provides faculty members with a better understanding of how to integrate findings of other researchers into their teaching practices.

The final type of benefit relates to the process of 'going public" while engaged in SoTL-based inquiries. This category includes the advantages of being openly and actively involved in the process of knowledge creation that goes beyond one's own professional context (Trigwell & Shale, 2004). It also includes the benefits related to having an increased opportunity to collaborate, to share perspectives and to learn from new colleagues from possibly different disciplines (Weimer, 2006) as well as to participate in professional communities and networks as a result of involvement in SoTL (Cox, Huber, & Hutchings, 2004). By doing so, SoTL scholars can focus on conversations with colleagues on important and substantive teaching and learning issues (Weimer, 2006) and positively influence the perspectives and practices of colleagues (Cox, Huber, & Hutchings, 2004). The act of sharing results of SoTL studies through the process of going public provides insights into the rather 'closed door' worlds of teaching and learning by having instructors document what they do and share the results with peers and others for further exploration, verification, critique, and investigation (Hatch, 2006). Finally, participation in SoTL studies can lead faculty members to see systematic classroom inquiry, not only as a means of professional enhancement, but as a means of supporting disciplinary or systems-level change as they consider the broader philosophical, pedagogical, and disciplinary implications of their analyses and findings (Hamilton, 2007; Huber & Hutchings, 2005; Hutchings & Shulman, 1999).

It is this sixth category that opens the door for the scholarship of teaching and learning to have a broader and more systematic impact at an institution-wide level that reaches far beyond the individual course or classroom.

## ADDRESSING KEY CHALLENGES:
## THE INSTITUTIONAL BENEFITS OF SOTL

Increasing institution-wide impact of the scholarship of teaching and learning activities can address a number of key challenges evident when individual faculty members engage in SoTL activities. For instance, engaging in SoTL can be a terribly lonely and isolating activity because often those faculty members engaged in its pursuit are often walking on new, uncharted ground in their home departments, taking unforeseen career risks, and perhaps, unwittingly trodding on the toes of other faculty members who are more critical and less supportive of this kind of research endeavour. McKinney (2004), Shulman (2004), and Schroeder (2007) concur about the academic loneliness of the SoTL scholar whom they observe often works alone with a limited support network and, sometimes, naively contributes to the promulgation of "often fragmented and isolated academic department silos" (Schroeder, 2007, p.1). This sense of isolation often deters faculty members from embarking on SoTL inquiries that could have been meaningful to him or her as well as being important to the institution. This is one of the prime reasons why institutional support structures are

very important to the ongoing efforts of individual faculty members to engage in scholarship related to teaching and learning.

Furthermore, Kreber (2001) discovered that one of the greatest challenges to the emerging field of SoTL is changing the recognition and rewards structures in universities to better reflect the commitments required by faculty to contribute to the benefits described in the last section. Although there has been great strides in many institutions over the last 20 years to provide better reward structures, such as broadened definitions of acceptable scholarship for promotion and tenure decisions, there is still work to be done in making SoTL-related inquiry a legitimate and highly-respected form of research and professional development that is open to the same recognition and reward opportunities as more traditional forms of disciplinary scholarship. Cross (2006) argues, however, that the quest to attain more extrinsic rewards of engagement in SoTL, such as publications, peer recognition, promotion, and tenure needs to be balanced with the internal motivations of why so many scholars entered the SoTL arena in the first place – the quest to better understand one's impact on student learning and how to improve its effectiveness.

Cox, Huber and Hutchings (2004) discovered that there is still an extensive confusion amongst faculty members engaged in the field about what is SoTL and what it is not. This confusion can hamper faculty engagement and limit the appropriate kinds of institutional support creating obstacles for the advancement of SoTL on university and college campuses unless time is taken to create an institution-specific definition of what constitutes SoTL-related research that can guide prospective SoTL scholars in the design of their studies and academic leaders who are making decisions about the ways to best support these efforts.

From the examples above, it is evident that the institutional context has great potential to support individuals in their engagement in SoTL-related work as well as the rewards and recognition structures that promote their sustained involvement (McKinney, 2007). What other institution-wide benefits exist and why should academic leaders consider these benefits when making decisions about supporting SoTL initiatives?

Institutional support structures can also be very important to the development and sustainability of a collective capacity to shift campus culture in a direction towards the advancement of pedagogical scholarship and the enhancement of the quality of teaching and learning in general (Huber & Hutchings, 2005). For instance, having faculty members engage in SoTL-based projects can help strengthen program initiatives at a departmental level that support more effective assessment approaches and strategies and provide additional information for program review and accreditation (McKinney, 2007). At a cross-departmental level, SoTL can foster cross-disciplinary conversations that can lead to changed and broadened perspectives about learning and teaching (Weimer, 2006). It can also help to develop new partnerships, networks, and relationships among faculty, students, and administrative staff (McKinney, 2007). From a whole-institution perspective, SoTL can provide a means of institutionally valuing teaching by encouraging faculty learning about how to improve practice and becoming more reflective about practice and provide more institutional recognition of teaching as scholarly work (Weimer, 2006). In a seminal keynote address, Shulman indicated that SoTL-based inquiry enables academics to avoid "the great tragedy of teaching" by avoiding "collective amnesia" about effective instructional practices (Shulman, 2001, cited in McKinney, 2007). Thus, SoTL projects can serve as a form of intelligence gathering about what works in a specific and unique institutional context. Furthermore, it can strengthen faculty development initiatives among early-career and mid-

career instructors as well as enhancing preparation programs for new faculty (McKinney, 2007).

Huber and Hutchings (2004) take the organization of institutional support structures one significant step further by cogently advocating for the development of an institutional teaching and learning commons that serves as a "big tent" (p.4) under which faculty engaged in the scholarship of teaching and learning can be supported by a thriving and dynamic community of peers engaged in similar pursuits while actively sharing their results beyond their own classrooms so that other faculty members and other disciplines can benefit from these efforts. Huber and Hutchings visualize this commons as a conceptual space that heightens ongoing dialogue, discussion, debate, and knowledge exchange about pedagogy and pedagogical issues of importance to the university and to higher education in general. Huber and Hutchings (2005) reflect on the potential lost opportunities of not developing the commons:

> Without a functioning commons, it is hard for pedagogical knowledge to circulate, depend through critique and debate, and inform the kinds of innovation so important to higher education today (p.5)

Thus, a key benefit of the commons is its role as an incubator for the development and adoption of innovations in action based on evidence-based inquiry that can lead to significant advancements in the quality of teaching and learning.


## A TYPOLOGY OF INSTITUTIONAL SUPPORTS


It is possible for SoTL initiatives in a college or university to grow and thrive informally, and rather organically, without the benefit of intentional strategies being implemented which can provide ongoing and sustainable support for faculty members engaged in this form of inquiry. Nevertheless, without strategic and targeted interventions, there are no guarantees that SoTL work will flourish and that the resulting benefits will have sustained benefits beyond the classroom. Thus, where do senior academic leaders begin if they want to take important steps in integrating SoTL into the fabric of the institution and fulfil many of the benefits outlined in the last section?

In answering this question, it is helpful to draw from the literature the kinds of institutional support strategies for SoTL that exist and have been applied in practice. Appendix A provides a typology of institutional supports available to academic leaders. Wherever possible, the typology also lists citations from the literature related to specific institutional supports for further reference. The purpose of this typology is to document and organize the broad range of initiatives discussed in the literature that can be adapted or implemented to provide support for the collective campus development of SoTL-related work. The typology examines institutional supports related to three purposes: (1) developing institutional expertise; (2) supporting research in action; and (3) sustaining collective engagement. Each of these purposes relates to a different stage of organizational maturity in the development of institution-wide SoTL programs. Although the three stages of institutional development can be considered successive, in reality, there is much interplay and integration between each of them.

In the typology presented in Appendix A, the initiatives associated with each purpose are organized by the possible institutional "leverage points" available to academic leaders. The following three kinds of leverage points are presented in the table:

1. *Leadership* – the individuals and groups that can exercise the right kind of influence and oversight to productively support the growth of SoTL work in the institution.
2. *Policy* – the protocols, principles, guidelines and academic regulations that need to be considered in support of SoTL.
3. *Organizational Structure* – the organization of lines of authority, communication, service delivery, and academic management to effectively and efficiently align SoTL initiatives with the organization's mission and provide centralized support for these projects.

Below is an expanded description of how these three leverage points are relevant to each of the three purposes described in the typology.


**Developing Institutional Expertise**


This stage focuses on assessing the state of institutional readiness for engaging in SoTL and building the necessary support structures and cultural norms for launching SoTL initiatives that will be successful. This stage can be considered as a pre-engagement phase where most effort is directed towards helping to establish the leadership practices, the plans and policies, and the structural elements of the organization that will encourage and support faculty in their eventual engagement in SoTL studies. The emphasis is placed on creating or transforming an institutional culture that respects and actively encourages faculty members who want to engage in research into their own teaching practices. Nevertheless, most SoTL initiatives do not begin as formalized and intentional programs (Huber & Hutchings, 2005). Instead, usually a SoTL initiative begins with a small group of pioneers in the institution who are interested in studying some issue related to their teaching practices and eventually stumble upon the SoTL-based literature or each other.  This helps to assure them that there are others who are interested in the same topic. Of course, SoTL could be introduced in a university or college as an intentional strategy. However there is usually some institutional history involving informal involvement that pre-dates the development of a formalized SoTL program.

Regardless of whether SoTL work begins informally or as a result of an intentional development strategy, there is still a need for key members of the university or college to build the institutional capacity to implement a more formalized SoTL initiative at the departmental, faculty, or whole university level if broader benefits are to be realized. Leadership in this stage involves building awareness within the institution of what SoTL is (and what it is not) through, such activities as inviting outside experts to share perspectives and models with faculty members, encouraging faculty members from the university with SoTL experience to share their perspectives in colloquia and workshops, and encouraging faculty discussions about the value of systematically examining and reflecting on their teaching practices (McKinney, 2007).

Leadership can also be demonstrated through the development of plans, policies, protocols, or procedures that serve to actively encourage participation in SoTL initiatives or to remove key barriers that get in the way of active participation of faculty in SoTL initiatives. For example, examining policies to determine whether engaging in SoTL-based research would

be recognized in the review of portfolios of those candidates seeking tenure or promotion (McKinney, 2007). Another example would be to include an orientation to the scholarship of teaching and learning as part of the new faculty orientation process.

The third leverage point relevant to the development of institutional expertise is the creation or enhancement of key structural elements of the university that together can serve as an essential or important support system for faculty engaging in SoTL inquiries. In some universities, this might involve enlisting the help of the institution's teaching and learning centre to organize workshops or seminars aimed at building faculty skills related to developing a SoTL inquiry (Nelson & Kleinsaaser, 2004). It could also involve developing a campus-wide SoTL steering committee to oversee how SoTL is introduced into the institution (Robinson, 2004). Furthermore, it may mean findings ways to link prospective SoTL studies to existing organizational initiatives, such as a campus-wide priority in literacy, or cross-curricular learning outcomes or technology integration, in order to increase the relevance and strengthen the focus of an emerging SoTL initiative (Ciccone, 2004).

## Supporting Research in Action

This stage can be best described as the process of 'getting the research done' and involves direct support for scholars who are currently actively engaged in SoTL. For many leaders, this will be where the rubber meets the road. It is where the investment in assessing and building readiness for engagement in SoTL-based work should have the most fruitful and direct impact on the individual scholars engaged.

In this stage, the leader's role might be as simple as providing ongoing informal encouragement to those engaged in the process of inquiry, such as regularly asking how the research is going or creating time on departmental agendas for SoTL scholars to check-in on the progress they are making on their studies. Nevertheless, leaders may also need to be actively involved in securing the necessary resources to facilitate faculty engagement in SoTL projects, such as course release time, supporting the attainment of research grants, and approving sabbaticals. Huber and Hutchings (2005) indicate that policy changes can have significant benefits to encouraging active engagement in SoTL projects. Thus, academic leaders may need to review and potentially adjust or revise current policies related to these supports to ensure that they do not serve as barriers for faculty who want to be actively engaged in SoTL projects. Department chairs or deans might find it helpful to work with faculty to identify common student learning issues across departments to encourage cross-disciplinary and collaborative SoTL inquiry (McKinney, 2007) or to develop working committees to consider the implications of the results of SoTL studies. As well, leaders may need to actively advocate for or support the development of the infrastructure that will help support scholars' active engagement in SoTL projects such as contributing to the development of summer institutes, project management services through the research office, or SoTL mentoring processes that provide SoTL scholars with additional guidance and resources (Weimer, 2006).

## Sustaining Collective Engagement

From an institutional level, this stage focuses on 'keeping the momentum going' and finding ways that SoTL-based initiatives (1) can continue to grow and evolve within the

organization: (2) can contribute to the development of a "teaching commons" within the institution (Huber & Hutchings, 2005, p.5.); and (3) can demonstrate organizational impact and influence. In many ways, this can be the most difficult stage to manage because it involves ongoing efforts by many people inside the organization to ensure participation of a critical mass of faculty members engaged in SoTL studies as well as those staff and faculty members responsible for coordinating the initiatives (Shulman, 2004). Furthermore, it involves finding ways to extend the sphere of influence of the results of SoTL studies so that other faculty can benefit from the research as well. Active leadership during this phase is essential to support the ongoing development and maturation of a SoTL program and for finding ways to collectively learn from the efforts of those faculty members involved in SoTL studies (Huber & Hutchings, 2005). For instance, leaders can facilitate the discovery of significant and creative ways to document and celebrate achievements related to SoTL and for acknowledging the ongoing importance of SoTL to the university's mission (Bauer, 2004; Jones, 2004). Furthermore, sustaining the university's efforts to maintain formal SoTL programs may also require additional resources and support obtained through the establishment of partnerships with other institutions, grant funding via external agencies, or endowments to the university. As well, like any major campus-wide initiative, there is a need to document and assess the impact of the program and to determine strategies for enhancing, altering, or revising the program (Lewis, Carter, & Patrick, 2004).

From a policy perspective, steps can be taken to ensure that the scholarship of teaching and learning is not viewed as a marginal activity but one that is highly valued across the organization over the long term. This outcome can be enhanced by building in references to supporting SoTL in academic strategic and operational plans, institutional research policies, collective bargaining agreements, and faculty promotion/tenure committees. Other helpful strategies in this phase involve conducting annual reviews of SoTL projects and developing strategies for determining how the results can potentially inform new innovations, academic reviews, and future policy initiatives (McKinney, Broadbear, Gentry, Klass, Naylor, & Virgil; 2007). Finally, it is helpful to consider how SoTL initiatives can be integrated with other significant campus-wide initiatives to maximize its profile and provide opportunities for a broader base of potential impact (Cox et al., 2004). Finally, citing the example of technology integration, Shulman (2004) suggests that it is helpful to link the scholarship of teaching and learning to key institutional initiatives that depend on the commitment of significant resources and, therefore, can benefit from a more evidence-based perspective on the implementation of the initiative in practice.

Regarding organizational structure, new entities can be created, such as endowed positions, self-standing academies or institutes that help to facilitate the institutionalization of SoTL support strategies. They also help to reduce the isolation of SoTL scholars who are scattered throughout faculties and schools in the organization and may not have a "community of shared interests" to support themselves collectively (Shulman, 2004, p. 10). As well, existing supports for other institutional functions and priorities, such as the development office, can be harnessed to ensure that there is adequate support for sustained efforts related to SoTL. Finally, developing cross-institutional partnerships related to SoTL provides a means for ensuring that the knowledge and experience from the combined efforts of multiple institutions is garnered and shared across different universities (Randall, 2004).

The overall list of possible institutional SoTL support initiatives described in the typology is broadly-based and quite comprehensive. An overview of the institutional support strategies, like the one presented in this appendix, helps to provide academic leaders with a multi-

pronged toolkit of strategies. Of course, academic leaders will need to determine which specific supports are most appropriate and relevant to their specific institutional context and purpose.

The typology provides a classification of the "whys" and "whats" but does not address the "hows" on moving forward with integrating SoTL into the fabric of the institution. The next section examines key institutional change concepts pertinent to the development of a culture of institutional support for the scholarship of teaching and learning.

## INSTITUTIONAL CHANGE AND THE
## SCHOLARSHIP OF TEACHING AND LEARNING

It is important to have a schema or a vision that can serve to organize the kinds of support initiatives that are applicable to the specific institution. When implementing a whole-institution approach to supporting SoTL, academic leaders will need to consider the intended impact of the support strategies. Is the objective solely to provide faculty scholars with the necessary supports to ensure their SoTL-based efforts are successful and sustainable or is support for SoTL viewed primarily as a means of knowledge-sharing and knowledge-building within the institution? Or is it conceived as an intentional transformational strategy aimed at changing the pedagogical culture of the institution?

A key factor in making decisions about which initiatives to support and implement is the overall 'return on investment' related to providing the necessary SoTL support. The level of institutional support may be dependent on the perceived university-wide benefits of developing a reasonably sophisticated infrastructure to promote and sustain faculty engagement in SoTL projects. Schroeder (2007) reminds us that one of the fundamental tenets cited by Hutchings and Shulman (1999) during the early years of SoTL's emergence as a legitimate field of inquiry was its promise and potential in advancing practice beyond the classroom. Nevertheless, Schroeder asserts that this call to action has often been rather narrowly confined to dissemination efforts via publications and presentations with rather dire consequences:

> Over time, however, we have erroneously coupled dissemination and publication of SoTL with SoTL becoming valued by the institution and with advancing practice beyond. If institutional impact is even considered, the target has almost singularly been changing tenure policies. Interestingly, SoTL's evolution over time has demonstrated that the publication and dissemination of SoTL and tenure policy changes alone will not dispel SoTL's marginalization from the institutional radar screen (pp.2-3).

Thus, it is important to consider the broad range of potential institutional benefits beyond publication and dissemination and how these will be documented and assessed over time to determine SoTL's overall impact (Babb & Gale, 2004).

Regardless of its specific purpose and scope, introducing institutional supports of any kind requires consideration of the institutional change processes inherent in their implementation. Randall (2004) indicates that "knowing what works in an institution in terms of change initiatives is critical, and the process must be contextualized" (p.182). It is also helpful to have a firm understanding of the research on institutional change models that is relevant to

the scholarship of teaching and learning and the implications of this research for the institution's own pathway forward (Cruz, 2014; Ginsberg, 2011; Schroeder, 2007). As a result, academic leaders need to consider their own institutional context when making decisions about which ones are most viable. With this point in mind, McKinney (2007) reminds us that there is no one, right or best model for the support of SoTL on campus. Rather, it is likely that institutional type, size, mission, resources, culture, and so on will all impact what best works where (p.111).

Shulman (2004) also mentioned the importance of the institutional context in his "Visions of the Possible" ruminations about how to create "organizational entities on our campuses that would support, preserve, and enhance the scholarly work of teaching and learning" (p.1). To this end, Cambridge's (2004) edited work describing institutional initiatives is particularly helpful because these initiatives are organized into categories that reflect increasing levels of organizational maturity. She also notes the value of considering the American Council on Education's matrix that features four kinds of change processes – adjustments, isolated change, far-reaching change, and transformational change. It is a worthwhile exercise to consider which initiatives provided in the typology reflect the scope of change reflected in each kind of process, given that this will differ considerably from institution to institution.

The kinds of initiatives included in the typology are consistent with Shulman's (2004) suggestion that centralized support for SoTL is best undertaken, and most readily embraced by faculty, when it helps to build capacity at the local level – in programs, departments, schools and faculties. This "distributed model" also enables the flexible deployment of resources to those units and entities that can best benefit from them and enables academic leaders to target specific areas that have fertile ground for SoTL to grow and evolve (Shulman, 2004, p. 17).

One limitation of employing a typology, even in a distributed model, is that it can overly compartmentalize initiatives. For instance, Cook (2004) explains that there is often a predisposition amongst many academic leaders to focus only on infrastructure development:

> Common wisdom says that the development of infrastructure is a key element in the process of institutional transformation, but structure alone is not the answer. An over-emphasis on the importance of structure can imply a rigid, causal determinism that simply does not hold true in real life. Structures change over time, and human agency, that is the efficacy of human actions, plays a major role in determining outcomes, no matter what the structure may be (pp.11-12).

Consequently, the typology was developed based on the assumption that many of the initiatives presented in the table will need to inter-relate and depend on human agency for their impending success. Therefore, it is important to consider the overall system of supports that are specific to the institution and that will provide the most effective foundation for a successful and sustainable SoTL program.


**CONCLUSION**


After 20 years of development, the scholarship of teaching and learning can securely move beyond a preoccupation with the challenges of definition to a focus on the opportunities for

impact. As well as increasing both personal engagement and contributions to knowledge in the field is there is significant potential that SoTL, in a coordinated and formalized way, holds many benefits for institutional change, reform, and growth.

Giving "institutional shape" to the scholarship of teaching and learning (Shulman, 2005, p.vii) serves as a means of fostering a community of SoTL scholars that can take root in various parts of the organization but it demands a constant interplay between identifying and implementing the most viable system of supports that enables SoTL work to flourish and ensuring that this flourishing leads to additional collective intelligence and institutional growth. As Huber and Hutchings (2005) suggest, building this collective entity is hard work:

> To move teaching from 'private to community property', to build a robust commons on a large scale, will require all of the intelligence, commitment, and imagination that the academic community can bring to bear. But the movement to do so is, we believe, one of the most hopeful signs that the academy will be able to fulfill its changing teaching mission in the year to come. (p.14).

Institutional support structures are critical to the building, development, and sustainability of a collective capacity to shift campus culture in a direction towards the advancement of pedagogical scholarship. Promoting SoTL development helps to grow evidenced-based inquiry and informed pedagogical innovations that help to ensure teaching and learning serves as the heart of a thriving, dynamic, and relevant academic enterprise.

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**Appendix A**

*A Typology of Institutional Supports for the Scholarship of Teaching and Learning*

| | **Leadership** | **Policy and Planning** | **Organizational Structure** |
|---|---|---|---|
| **Developing Institutional Expertise** | • Making pedagogical literature available to faculty via library or circulated directly via email or in mailboxes (Weimer, 2006).<br>• Developing pedagogical reading lists for new faculty (Weimer, 2006).<br>• Implementing faculty-wide or campus-wide-reading groups on important topics related to learning and teaching (Weimer, 2006).<br>• Placing teaching topics on meeting agendas to stimulate faculty engagement, sharing of perspectives and asking of important questions (Hamilton, 2008; Weimer, 2006).<br>• Inviting experts to speak about SoTL topics on campus (McKinney, 2007).<br>• Organizing a learning and teaching symposium that includes a focus on SoTL (McKinney, 2007). | • Developing an institutional definition of SoTL (Cambridge, 2004).<br>• Conducting an audit of SoTL projects and support strategies already in place (McKinney, 2007).<br>• Incorporating SoTL themes into institutional frameworks, mission statements, and strategic plans (McKinney, 2007; Glick, 2004).<br>• Generating longitudinal data about SoTL practices and research to provide a baseline and to assess impact over time (McKinney et al., 2004).<br>• Providing course release time to mentor other colleagues who are engaging in pedagogical inquiry (Weimer, 2006)<br>• Develop SoTL awareness building sessions with tenure and promotion committees | • Developing an institution-wide SoTL steering or implementation committee (Robinson, 2004).<br>• Enlisting the help of the institutional teaching and learning centre in developing institutional priorities and expertise-building initiatives related to SoTL (Nelson & Kleinsaaser, 2004).<br>• Developing a SoTL website with helpful information for prospective scholars (McKinney, 2007).<br>• Linking new SoTL initiatives to existing faculty development priorities (Ciccone, 2004). |

| Leadership | Policy and Planning | Organizational Structure |
|---|---|---|
| • Leading by example – having senior leaders know the pedagogical literature and be willing to ask questions about their own teaching (Weimer, 2006).<br>• Developing department and faculty-wide norms that encourage participation in SoTL (Cox et al., 2004).<br>• Promoting SoTL with new faculty as part of their institutional orientation (McKinney, 2007).<br>• Conducting SoTL awareness-building sessions with departmental chairs and deans (McKinney, 2007).<br>• Bringing national leaders to the institution to help with developing capacity-building strategies (Lieberman, 2004).<br>• Engaging the campus community to help determine what is both unique and essential in the institution's learning and teaching identity (Hamilton, Marquez, & Aggar-Gupta, 2013a). | (McKinney, 2007; Ravaioli & Shaffmaster, 2004).<br>• Considering SoTL expertise in selection and hiring committees (McKinney, 2007; Roen, 2004).<br>• Including SoTL as a priority in the seeking of research funding (McKinney, 2007).<br>• Offering faculty development funds for attendance at SoTL conferences, workshops, and institutes (McKinney, 2007).<br>• Commissioning faculty to prepare white papers on pedagogical issues identified as important across the institution and then discussing these across the institution (Weimer, 2006).<br>• Creating a positive institutional research agenda that actively inquires into learning and teaching issues that are important across the campus (Weimer, 2006) | |

| | Leadership | Policy and Planning | Organizational Structure |
|---|---|---|---|
| **Supporting Research in Action** | • Developing pedagogical informal or formal support groups to help practicing SoTL scholars (McKinney, 2007; Weimer, 2006).<br>• Creating writing support groups (Weimer, 2006).<br>• Providing direct encouragement and check-ins with SoTL scholars. | • Identifying common student learning issues across departments to encourage cross-disciplinary and collaborative SoTL inquiry (McKinney, 2007).<br>• Providing course release time to conduct pedagogical inquiry or mentor other colleagues who are engaging in pedagogical inquiry (Weimer, 2006: Cox et al., 2004).<br>• Ensuring that sabbaticals can be dedicated to engaging in scholarly research on teaching and learning (Weimer, 2006).<br>• Offering small-scale research funding or fellowships to SoTL scholars (McKinney, 2007; Albers, 2004).<br>• Ensuring that institutional research committees are knowledgeable about ethical issues related to SoTL research and ways to address them (Martin, 2014; McKinney, 2007). | • Ensuring that the institution's research office provides supports for pedagogical scholarship – small-scale grants, becoming knowledgeable about the SoTL implications for the ethical review application process, helping to disseminate, helping to link faculty members who might have similar interests, actively seeking sources of grants (Hamilton, Marequez, & Aggar-Gupta, 2013a).<br>• Organizing summer institutes to help SoTL scholars prepare for their research studies (McKinney, 2007).<br>• Creating teacher-scholars within departments and schools who can provide guidance and mentoring for SoTL project (McKinney, 2007).<br>• Starting a SoTL journal or newsletter to disseminate study results and related information (McKinney, 2007).<br>• Developing a SoTL website with helpful information for prospective scholars (McKinney, 2007).<br>• Creating an online community of |

| | Leadership | Policy and Planning | Organizational Structure |
|---|---|---|---|
| | | | support providing resources, possible mentors, and connections for faculty interested or already engaged in SoTL (McKinney, 2007). |
| **Sustaining Collective Engagement** | • Involving students in conversations about SoTL, inviting their ideas about future projects and collaborating with them in research projects. (McKinney, 2007; Lieberman, 2004).<br>• Engaging in regional, national, and international dialogues on learning and teaching (Jones, 2004).<br>• Finding significant and creative ways to document and celebrate achievements related to SoTL (Bauer, 2004; Jones, 2004).<br>• Getting involved in regional or national programs related to advancing SoTL agendas.<br>• Becoming a regional or national centre of expertise in SoTL.<br>• Developing partnerships or consortia with other institutions to share resources and faculty | • Building in references to supporting SoTL in academic strategic and operational plans (McKinney, 2007).<br>• Developing research-related policies that acknowledge and support the institution's commitment to SoTL (Hamilton, Marquez, & Aggar-Gupta, 2013a).<br>• Ensuring that the value of pedagogical scholarship is recognized in collective bargaining agreements (Ravaioli & Shaffmaster, 2004).<br>• Integrating SoTL into other significant campus-wide initiatives (Cox et al., 2004).<br>• Creating institutional standards for assessing the quality of pedagogical research that can be used in | • Considering how different administrative departments can provide sustained support for SoTL initiatives (McKinney, 2007).<br>• Creating a freestanding, faculty-organized, and faculty-driven teaching academy (Broder & Kalivoda, 2004).<br>• Creating an endowed chair position to promote SoTL initiatives (McKinney, 2007).<br>• Developing partnerships with the institution's development office to determine ways to gain financial support through endowments and other fundraising strategies (Hamilton, Marquez, & Aggar-Gupta, 2013a).<br>• Initiating cross-institutional collaborative inquiries (Randall, 2004).<br>• Linking SoTL to the acculturation |

| Leadership | Policy and Planning | Organizational Structure |
|---|---|---|
| development related to SoTL (Roen, 2004; Randall, 2004). <br>• Helping institutional partners realize their contributions have yielded an effective return on investment (Lieberman, 2004). <br>• Ensuring campus leaders are visible in acknowledging the ongoing important of SoTL to the university's mission (Albert, Moore & Mincey, 2004). <br>• Drawing on the resources provided by external agencies (Roen, 2004). <br>• Documenting the development of the infrastructure supporting STL and self-analysing it to plan future efforts (Smith, 2004; Shulman, 2004). <br>• Identifying key indicators and assessing the impact of institutional SoTL efforts (Lewis, Carter, & Patrick, 2004). | faculty promotion and tenure committees (Weimer, 2006; McConnell, 2004; and Ravaioli & Shaffmaster, 2004). <br>• Doing annual reviews of SoTL projects and how the results can potentially inform new innovations, academic plans, and future policy initiatives (McKinney, Broadbear, Gentry, Klass, Naylor, & Virgil 2007). <br>• Integrating SoTL criteria into teaching, research, and service awards (McKinney, 2007). | and development of graduate students (Shulman, 2004). <br>• Developing faculty exchanges between institutions to enable SoTL projects to be pursued in new venues (Shulman, 2004). |

# TOWARDS THE DEVELOPMENT OF A MASS CUSTOMIZATION e-COURSE TEACHING MODEL AT SIM UNIVERSITY

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*The concept of mass customization (MC) has been well researched and proven to be effective in helping organizations improve its customer-manufacturer interactions especially in the manufacturing industries. The underlying idea of MC is to customize production efforts of an organization to fulfil its customers' needs with near mass production efficiency. In this paper, we posit that the MC idea is highly appropriate to be applied in the context of e-Course teaching in SIM University, Singapore's only University specially catering to the continuous educational needs of working adults. We support this assertion by reviewing comprehensively the literature of MC, identifying the drivers and limitations of MC and discuss how these limitations can be overcome. Leveraging upon the findings from the literature, we propose a conceptual e-Course teaching model that is capable of customizing the teaching according to the learning needs of students in a course at SIM University. We discuss the implications of realizing this model and argue how this will improve the students' conceptual understanding of topics in class, make class engagement more effective, and provide a new insight on how lecturer's teaching effectiveness can be measured.*

**Keywords:** Mass customization, e-Teaching, Peer Instruction, e-Learning.


## INTRODUCTION

The concept of mass customization (MC) was first introduced by S. Davis (1989). Over the last two decades, research on mass customization (MC) has grown significantly and the implementation of MC has been proven to be effective in various industries such as the food (McIntosh, Matthews, Mullineux, & Medland, 2010), electronics (Partanen & Haapasalo, 2004), mobile phones (Comstock, Johansen, & Winroth, 2004), homebuilding (Barlow et al., 2003), the production of foot orthoses (Pallari, Dalgarno, & Woodburn, 2010), personalized nutrition (Boland, 2008), and large engineered products (Lu, Petersen, & Storch, 2009).

The objective behind MC is to allow an organization to develop highly flexible production capability to fulfill a customer's need with near mass production efficiency (Tseng & Jiao, 2001). This objective seems highly aligned to fulfill a student's need for higher education in the 21st century. The current teaching of higher education is based on a 'one-size-fits-all' model where lecturing is the predominant form of instruction and occupies a large percentage of face-to-face class time (Lammers & Murphy, 2002; Robinson, 2010; Twenge, 2009). Yet, there are mounting empirical evidences that clearly demonstrate that students will learn more, develop better conceptual understanding, increase engagement in class, attend class more often, and are more persistent in learning when a customized teaching method is used instead of the traditional 'one-size-fits-all' lecturing (e.g. Armbruster, Patel, Johnson, & Weiss, 2009; Deslauriers, Schelew, & Wieman, 2011; Saville, Zinn, Neef, Van Norman, & Ferreri, 2006).

Consequently, researchers and practitioners in the field of teaching and learning have called for the implementation of customized teaching method to improve the efficiency of classroom teaching (Fried, 2008; Nistor, Dehne, & Drews, 2010; Piller, 2002; Piller, 2003; Waslander, 2007).

In a customized teaching method, the role of a lecturer in a classroom has been significantly transformed (Young, 2005). While lecturers are still expected to help students master the course content, they are also expected to customize the teaching materials in a classroom to: (1) increase students' academic self-efficacy (Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011; Marsh & Martin, 2011); (2) improve students' self-regulatory capability (Boekaerts, 2002; Zimmerman & Schunk, 2011); (3) enhance students' feelings toward learning (Duncan & Arthurs, 2012); and (4) instil values and skills in students that promote lifelong learning (Aspin, Chapman, Evans, & Bagnall, 2012).

Gone was those days when delivering a highly standardized class will meet the learning needs of students today. The emergence and success of various massive open online course (MOOC) platforms, e.g. Khan Academy and Coursera, are the reflection of students' needs for customized teaching. SIM University is the only private University in Singapore currently offering part-time degree programmes to predominately working adults. Currently, the teaching pedagogy of almost all e-Courses in SIM University is based on a 'one-size-fits-all' lecturing model. We argued that MC is highly appropriate to be applied in the e-Course teaching model of SIM University because: (1) most of the students in SIM University are working adults and MC has been applied successfully in the corporate training of working adults (Nistor et al., 2010). Hence, we think that the application of MC will likely benefit SIM University in similar way; and (2) the current SIM University's e-Course teaching model, while has its shortcomings, has all the necessary foundations to support the effective implementation of MC. This will be elaborated further in the later part of this paper. Drawing inspiration from these successful MOOC platforms and the literature of MC, the focus of this paper is to propose and present a MC e-Course teaching model capable of providing customized teaching according to the identified learning needs of students in a course at SIM University.

## LITERATURE REVIEW

The teaching of a course in a University can be viewed as a manufacturing system. This system is designed to provide a teaching service to meet learning needs of a student. The current teaching model in a University is predominately based on a 'one-size-fits-all' model despite various studies indicating that a customized teaching method is more superior in meeting the learning needs of students (e.g. Armbruster et al., 2009; Deslauriers et al., 2011; Freund, 2004; Saville et al., 2006). To enable the customized teaching in a course, we postulate that the literature of mass customization (MC) can help to shed some important insights.

**Why Mass Customization is Highly Applicable to a University's Teaching**

The essence of mass customization (MC) for a manufacturing firm is the "capability to manufacture a relatively high volume of product options for a relatively large market (or a collection of niche markets) that demands customization, without tradeoffs in cost, delivery, and quality" (McCarthy, 2004, pp. 348). Guided by this definition, we see a teaching service in a University as a "product" that should be customized to meet as many learning needs of students as possible without a significant tradeoff in cost, delivery, and quality.

We believe our assertion that a teaching service can be customized through the application of MC strategies in manufacturing is supported by the following reasons. First, the rise of MOOCs demonstrates growing needs to provide customized e-Course teaching to meet diverse learning needs of students around the globe. These MOOCs have given us a proof-of-concept to demonstrate significant teaching pedagogical benefits of customizing e-Course teaching. Second, the challenges faced in a MC implementation in a manufacturing firm is very similar to the challenges in customizing an e-Course teaching. For example, two challenges that a manufacturing firm will face when trying to customize their product are: (1) how to effectively and efficiently capture and process the highly varied and uncertain customer's preferences; and (2) how to assemble materials to produce a range of products' options to meet these preferences without incurring a significant amount of costs and/or at the expense of quality (Ahlstrom & Westbrook, 1999; Duray, 2002; Salvador, Forza, & Rungtusanatham, 2001; Tu, Vonderembse, & Ragu-Nathan, 2001). This is very similar to the challenges faced by any University when trying to customize their course's teaching according to learning needs of its students. Transforming from a 'one-size-fits-all' teaching model to a customized one will require an effective and efficient system to capture and process the varied learning needs of students and to create the customized teaching materials and delivery to meet those needs. As a result of this similarity in challenges, we believe that solutions developed to address the challenges of customizing a product in a manufacturing context will be highly applicable in customizing an e-Course teaching in a University's context.

This idea of applying MC into the education context has also been supported in part in the literature of teaching and learning. Nistor et al. (2010) incorporated the idea of MC into the design of a MC framework called 'amit' and shown how its application leads to time saving in acquiring new knowledge by working adults while achieving a high training efficacy in the delivery of corporate training. Freund (2004) argued how the application of MC teaching model together with Gardner (2011)'s multiple intelligence theory can help education institutions gain a competitive advantage. Piller (2002) discussed the emerging needs of students towards customized teaching and argued how the application of MC can help to overcome the challenge of developing customized teaching with no or little extra cost. He further pointed out that traditional teaching models are either based on a highly standardized teaching that focuses on 'one-size-fits-all' delivery or a highly customized teaching fitting the unique needs of each student. The customized teaching enhances the learning experiences of students significantly but at a high cost (Piller, 2002; Piller, Moeslein, & Stotko, 2004). This is in contrast with the low cost in providing mass education in a highly standardized teaching model, which has been the de-facto teaching model since 1892 (Freund, 2004). Piller (2002) went on to argue that the way to overcome this 'efficiency-cost' paradox in teaching is to apply the principle of mass customization into the teaching model. Yet, notwithstanding the current researches in the literature, there are very little conceptual and empirical studies that

can shed lights on how this MC can be applied in a University's context. This gap in the literature motivates us to develop our MC e-Course teaching model in this paper.

**The Potential Limitations when Implementing Mass Customization**

Before we discussed our proposed teaching model, we wish to highlight the limitations of mass customization (MC) that a University will need to consider when adopting MC to an e-Course teaching. Adapted from limitations of mass customization in the manufacturing field as highlighted by Zipkin (2001), we posit that a University's success in implementing MC effectively into their teaching model will be limited by the strengths of a number of organization capabilities. They are: (1) a University must have an effective elicitation system that is capable of collecting and analyzing the student's learning needs of a course accurately and cost effectively; (2) a University must have a flexible process in the development and delivery of e-Course teaching to accommodate the customization requirements of the students, without substantial trade-offs in cost, delivery, and quality in teaching. In this regard, a University will need to carefully consider the extent of this customization effort (i.e. whether the teaching should be customized to the level of an individual, a group, a class, or a course). Obviously, as the customization effort moves closer towards the individual, the cost of delivering the course will substantially increase; (3) a University must have an effective feedback system capable of providing reliable information on whether the identified learning needs of students are fulfilled during the e-Course teaching; and (4) the implementation of MC will involve a significant effort in organizational change. A University must have an effective change management capability to navigate the various hindrance factors, the structural inertia, and the transition hazards involved during such implementation (Rungtusanatham & Salvador, 2008).

## PROPOSED MC e-COURSE TEACHING MODEL IN UniSIM

In SIM University, an e-Course consists of three pre-class quizzes and three face-to-face sessions are interlaced in a way as shown in Figure 1.

| Pre-class Quiz 1 | Face-to-face 1 | Pre-class Quiz 2 | Face-to-face 2 | Pre-class Quiz 3 | Face-to-face 3 |

Figure 1. SIM University e-Course Structure.

Each pre-class quiz is supposed to test a student's memory of key definitions, concepts, and terms of a specific topic in the course. It is assumed that when students pass the pre-class quiz, he/she would have acquired sufficient knowledge to allow for his/her active participation in class activities during the face-to-face session. However, this existing approach has two key issues.

First, students being able to remember key definitions, concepts, and terms of a topic do not necessarily mean that they have acquired the necessary conceptual understanding of the topic.

Second, the face-to-face session is still predominately implemented using the traditional 'one-size-fits-all' approach. Every teaching material used in class is designed by the Associate Faculty and standardized across the teaching team regardless of the diverse learning needs of each cohort of students for that course.

Despite its shortcomings, the existing approach has several characteristics that make it ideal for the application of mass customization. The existing pre-class quiz provides an elicitation system that allows the learning needs of each of cohort of students in a course to be effectively collected and analyzed at almost no additional cost. With this information, teaching materials can be customized at course level by the teaching team accordingly. We advocate the customization of teaching materials at course level for a number of reasons: (1) customization at individual and group level will inevitably increase the cost of education in SIM University; (2) customization at class level may potentially lead to students claiming that they are being disadvantaged when they are not being taught a specific topic in a course. For these reasons, we feel that it is more appropriate to customize the e-Course teaching at course level.

We also advocate the adaption of peer instruction during the teaching delivery because it has been widely recognized as an effective teaching method in increasing a student's understanding of concepts in a topic (Lasry, Mazur, & Watkins, 2008). We do this because the proposed peer instruction teaching method will provide a feedback system that not only allows us to determine the effectiveness of the customized teaching efforts, but will also shed insights about the effectiveness of the lecturer's teaching. This is an important element that we need to address in order to realize the full benefits of mass customization as advocated in the literature (Zipkin, 2001).

The success of MC in a manufacturing context depends very much on the efficiency of the information transfer from the customers to manufacturers (Turowski, 1999). When the customers' needs are transferred effectively in a timely fashion to the manufacturer, the manufacturer can customize the construction of its product based on these identified customer's needs. However, in order for a manufacturer to achieve a mass production efficiency during the customization process, he/she will need to develop a modularized catalog of parts that made up its products. These parts are flexibly combined during construction to deliver the product that is desired by the customers. This is very similar to the student-lecturer interaction in a course. Adapting steps involved in a customer-manufacturer interaction during a mass customization (MC) process (Da Silveira, Borenstein, & Fogliatto, 2001), we present the conceptual underpinnings that will govern the student-lecturer interaction in the teaching of an e-Course and they are highlighted in Table 1.

**Table 1**

*Mass Customization in Delivering Personalized Teaching*

| Step | Mass Customization Steps in Manufacturing Personalized Services/Products (Da Silveira *et al*., 2001) | Mass Customization Steps in Delivering Personalized Teaching |
|---|---|---|
| 1 | Building the product catalog | Build a catalog of teaching materials for each identified topics in an e-Course. The catalog should consist of conceptual questions, problem-based learning questions, case studies, and videos. |
|  |  | It should also consist of a set of questions that can be used to test the conceptual understanding of topics by the student which will be used in Step 4. |
|  |  | The idea is to develop a comprehensive set of modularized teaching content and test questions that can be readily used in class. |
| 2 | Configuring customer orders | Configure a set of specially designed pre-class quiz and questionnaires to uncover the student's learning needs of topics in an e-Course. |
|  |  | The quiz and questionnaires should include questions that test the conceptual understanding of students on a specific topic and questions that ask the student to express which topic is particularly difficult to learn. |
| 3 | Transferring orders to manufacturing | Transfer student learning needs uncovered in Step 2 into the development of a set of customized teaching materials by mixing and matching contents from the catalog developed in Step 1. |
| 4 | Manufacturing customized orders | Deliver the customized course contents in class. |
|  |  | For every topic that is being taught, lecturers will conduct a post-topic assessment to assess students' level of understanding of a topic. More details on how this can be done is elaborated in the next section of this paper. |

The proposed approach that we advocate to enable mass customization s teaching in SIM University is discussed in details below.

***Step 1:*** *Build a catalog of teaching materials for each identified topics in an e-Course.* Creating modularized components that can easily be assembled to deliver customized products is one of the most effective way to achieve mass customization in the manufacturing and service industries (e.g. Ahmad, Schroeder, & Mallick, 2010). Hence, we posit that this modularization idea be applied to the development of the teaching materials used in a course. A 'teaching catalog' akin to the 'product catalog' is created which can be flexibly combined based on the identified student's learning needs in a course. Such development of teaching materials can be developed through the concerted efforts among the teaching team coordinated by the Associate Faculty of the course. When the teaching materials are systematically modularized based on the topics in a course, the teaching team can customize the course easily with almost 'mass production efficiency'.

***Step 2:*** *Configure a set of specially designed pre-class quiz and questionnaires to uncover the student's learning needs of topics in an e-Course.* The difference between this step and the existing pre-class quiz lies in the design of the questions. Questions are designed in this step to emphasize on a student's conceptual understanding of the topic. It should not be just focused on a student's memorization of key definitions, terms, and concepts. Instead, for each question, the student will also be asked about the confidence level of his/her answers (e.g. from confident to not confident). The overall quiz score for the student will be dependent upon the correctness of his/her answers. The student will be allowed to attempt the quiz multiple times and only the best score will be captured. Subsequently, the confident level and the correctness of students' answers will be used to uncover the student's learning needs in a course. The introduction of the confident level in each question allows us to trace the improvement of the student's conceptual understanding of a topic after the face-to-face session. It also allows the teaching team to use the information to customize the teaching materials for the course. For this reason, the number of questions in the pre-class quiz and questions that purely test on student's memorization of key definitions and terms should be minimized.

***Step 3:*** *Transfer the student's learning needs uncovered in Step 2 into the development of a set of customized the teaching materials that are developed in Step 1.* The quality of the student's discussion and learning in a classroom depends very much on the quality and the appropriateness of teaching materials used in course. When determining suitability of teaching materials in a course, a lecturer needs to know which topics in a course that students find it difficult to understand. By using the feedback received in Step 2, the teaching team will be able to gain an in-depth understanding about this difficulty and customized teaching materials from the catalog developed in step 1 to be used in the face-to-face session.

***Step 4:*** *Deliver the customized course contents in class and conduct post-teaching assessment.* The teaching delivery will follow the process as illustrated in Figure 2. We draw inspiration from the Peer Instruction teaching process as advocated by Lasry, Mazur, and Watkins (2008) to develop this teaching delivery process in our model. The set of questions developed in step 1 can be used by a lecturer to test the conceptual understanding of a topic by students after conducting the customized teaching activities. This provides a direct feedback to the teaching team which allows the team to customize the next course of actions in class. The scores obtained from these questions can also be captured using IT and can be used for: (1) further post-class analysis by a lecturer; and (2) teaching effectiveness evaluation of a lecturer. The post-class analysis by a lecturer is particularly useful in helping

the lecturer determines the subsequent online activities after the face-to-face session. These online activities can be developed and archived into the teaching catalog for future use.

We propose to implement the MC approach and test its effectiveness in one of the existing SIM University's e-Course, 'FIN371 Retirement Planning' from the Bachelor of Science Finance Programme. We have selected this course because of the following reasons. First, this course was presented as a traditional course with six face-to-face sessions in the previous semester, and it is going to be converted as an e-Course with three face-to-face sessions in the July 2014 Semester. Therefore, it is a good timing to implement our proposed design into this course since it allows us to compare the effectiveness of our design with the traditional teaching method. Second, given that it is a level three course and the nature of this course being focused on retirement planning, students are expected to acquire a good comprehension and application of the course contents. As a result, we believe that a lecturer's teaching effectiveness and customized teaching will have a significant impact on the students' performance in this course. Finally, based on the past enrollment data, we anticipate that the class size for this course will be sufficiently large to allow for at least two concurrent classes to be scheduled.
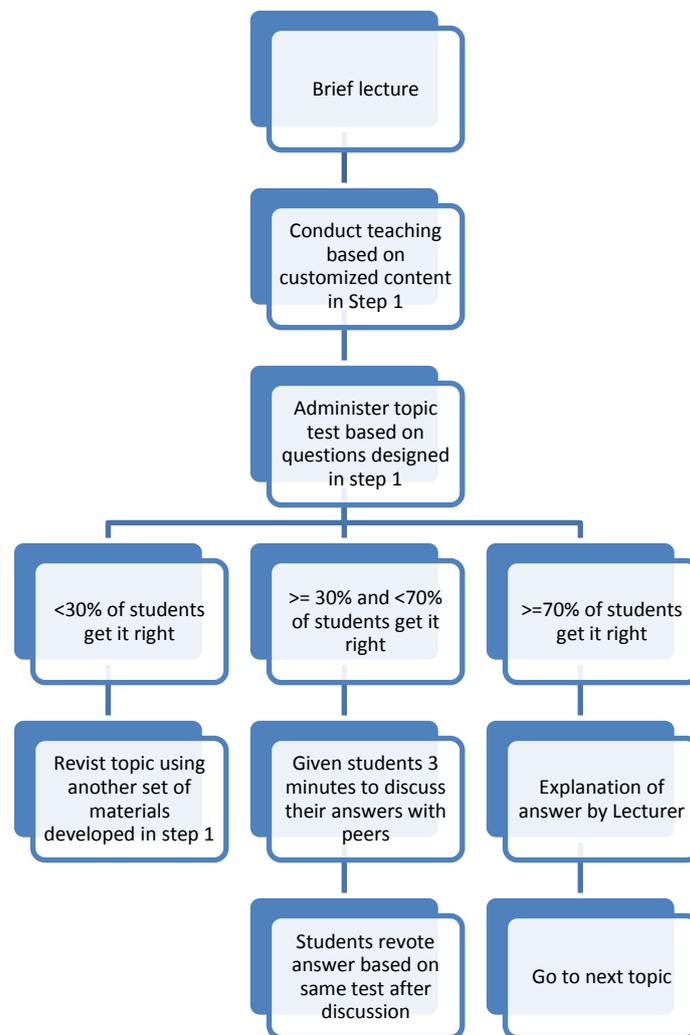


Figure 2. The Mass Customization e-Course Teaching Process (Adapted from Lasry et al., 2008).

**IMPLICATION TO SIM UNIVERSITY**

There are several potential advantages and disadvantages if our proposed mass customization (MC) e-Course teaching model is implemented in SIM University. The potential advantages of implementing this MC e-Course teaching model in SIM University are as follows. First, we have proposed a model that is capable of customizing the teaching of an e-Course according to the learning needs of our students in a course. This is an essential step to realize the benefits of customized teaching as advocated in the literature (e.g. Armbruster et al., 2009; Deslauriers et al., 2011; Saville et al., 2006). Second, the development of a comprehensive set of modularized teaching materials will allow us to achieve 'mass production efficiency' in the development of teaching materials (Nistor et al., 2010). This, not only, has the potential of significant cost savings in our course development, but will also encourage the sharing of teaching approaches and nurture teaching's creativity in our lecturers. For example, the availability of teaching approaches and materials in a repository can serve as an initial starting point for all new course development. Thus, it helps to reduce the cost and enhance a developer's creativity during the process of course development. Third, the use of technology in the implementation of the MC e-Course teaching process (see Figure 2), will provide invaluable data where teaching effectiveness of an instructor in class can be effectively assessed. For example, the improvement of the topic's test score in class can be directly attributed to the efforts made by the lecturer. In contrast to the existing way of measuring the teaching quality of a lecturer, we believe this data is more representative of a lecturer's teaching capability. Fourth, the scores of the topic's test that are captured in a class can also be used to guide the development of subsequent online activities during the week that there is no face-to-face session. These online activities can also be customized based on the scores of these topic's tests. Fifth, we believe the MC e-Course teaching model will help to increase the student's conceptual understanding of topics and enhance his/her learning. Hence, we postulate that the assessment scores of students for e-Course that adopted our model will likely improve as compared to the traditional way of teaching.

Similar to the application of MC in a corporate training by Nistor et al. (2010), we believe the following potential disadvantages of implementing this MC e-Course teaching model in SIM University may occur. First, the initial development efforts for the teaching catalog may be significant. This may go against the 'mass production efficiency' that MC is supposed to achieve. However, these efforts will become significantly lesser if the same teaching catalog is being reused across the semesters (assuming that the course contents do not change significantly over this period) (Nistor et al., 2010). Second, there may be an increase of stress among the teaching team to customize the teaching materials in time for the classes since the end of the pre-class quiz and the face-to-face session is probably only separated by two to three days. This may lead to 'resistance' from the teaching team in the change effort as advocated by Rungtusanatham and Salvador (2008).

**CONCLUSION**

This paper discusses the application of the mass customization (MC) concept used in the manufacturing and service industries into the teaching of a SIM University's e-Course. We review the literature of MC and argue why it is suitable in an e-Course teaching context and provide some discussion on the limitations of MC. The justifications on why the existing e-Course approach in SIM University have all the required characteristics to overcome the

limitations of MC identified in the literature are presented. Using the extant literature, a proposed step-by-step e-Course teaching model is discussed. We argue why our proposed model should be and can be implemented in SIM University and offer our views on the implications to SIM University if our model is applied to an e-Course teaching.

We believe this implementation of our MC e-Course teaching model in SIM University will increase our students' conceptual understanding of topics taught in course. It will also help lecturers become more effective and efficient in the delivery of their teaching. Finally, we believe the data obtained during class will provide a more objective assessment of the teaching effectiveness of a lecturer as compared to the current teaching evaluation mechanism.

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