

Grappling with the Complexity of Undergraduate Degree Program Reform: Critical Barriers and Emergent Strategies

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Abstract:

This article examines the complexity of undergraduate degree program reform in multinational, institutional, and disciplinary settings using data collected over a 10-year period. Developing learning-centred curricula that are responsive to the needs and circumstances of the pedagogical context is clearly a complex and multifaceted process. Data from this research suggest that inherent challenges of undergraduate degree program reform can be addressed through learning-centred strategies specific to the context of curriculum, as well as the iterative processes of curriculum development, implementation, and evaluation. In particular, scholarly approaches to curriculum practice engage curriculum learning communities in critical issues pertaining to resource commitments, student engagement, curriculum integration, and the extent to which the curriculum is effective in achieving its goals.

Integral to this paper is an example of a digital media recording of an educational development workshop with multidisciplinary faculty members at Aston University (UK). The aim of this workshop was to engage faculty to compare and contrast critical barriers and emerging strategies for undergraduate degree program reform with faculty experiences in a Canadian context (see Appendix A).

Key Words:

Scholarship of curriculum practice, complexity of undergraduate degree program reform, curriculum learning communities, strategies for curricular redesign.

Introduction

Undergraduate degree program reform is a highly complex and challenging process for institutions and disciplines the world over. Social, political, economic, organizational, cultural, and quality assurance factors are at play, and people with varying interests and institutional responsibilities are involved, including administrators, members of curriculum committees, course instructors, and students (Bresciani, 2006; Schnieder & Schoenberg, 1999; Davis & Sumara, 2006). Further, although undergraduate degree program reform might be described as having distinct phases of development, implementation, and evaluation, these are iterative rather than linear in nature (Hubball & Burt, 2004). Thus, very often, macro (e.g., institutional), meso (e.g., departmental), and micro (e.g., classroom practice) obstacles must be overcome in order to achieve the required level of change and contextual sensitivity for undergraduate degree program reform (Drummond, Nixon, & Wiltshire, 1998; Fanghanel, 2007; Kezar & Eckel, 2002; Smith, 2004).

Principles and practices of learning-centred curricula have been well documented in the scholarship of teaching and learning (SoTL) literature (Driscoll & Wood, 2007; Grunert O'Brien, Millis, & Cohen, 2008; Hubball & Burt, 2004; Hubball, Mighty, Britnell, & Gold, 2007). Further, numerous anecdotal accounts exist regarding specific challenges with curriculum change; however, very little research has examined the complexities that hinder and strategies that enhance undergraduate degree program reform (Hubball & Gold, 2007; Hubball & Pearson, 2009; Wolf, 2007). Hubball & Burt's (2004) conceptual framework for learning-centred curricula in higher education contexts identifies iterative phases of development, implementation, and evaluation. Guided by key elements within this framework, this paper examines critical barriers and emergent strategies to enhance undergraduate degree program reform.

Complexity within the curriculum context

Scholarly approaches to curriculum practice take into account the unique character of the particular institution or department, with regard to its faculty and students, resources and systems, and pedagogical practices (Bresciani, 2006; Harp Ziegenfuss & Lawler, 2008; see also Appendix A). For example, it is important to understand the changing nature of the undergraduate student body when considering significant curriculum redesign. The massification and globalization of higher education has led to a considerable increase in student numbers and diversity. Universities, for example, are seeing more students, with a greater range of academic ability and preparedness, learning styles, technological ability, language proficiency, cultural background, and personal circumstance related to age, lifestyle, and commitment to higher education (Kreber, 2009; Bridges, 2000).

Contextual factors that must be addressed when considering significant curriculum changes include program and institutional priorities and human resource issues. There are, for example, competing interests within academic programs, such as needs for curricular coherence versus flexibility, for breadth versus depth, and for the acquisition of disciplinary content knowledge versus general, transferable skills (Roy, Borin, & Kustra, 2007). Faculty members and administrators face challenges such as lack of time due to already-substantial workloads and lack of curricular and pedagogical

expertise needed for effective participation in the curricular reform process (McInnis, 2000). Institutional barriers to change include entrenched systems of credit hours, course scheduling, and methods of teaching and assessment; departmental or disciplinary isolation; and administrative structures, funding mechanisms, and reward systems that value research priorities rather than curriculum leadership and educational missions (Harris & Viney, 2003; Schneider & Shoenberg, 1999). Compounding these factors are the changing understandings of the processes of learning, the availability of new educational technologies, and the stage-specific readiness of academic units for curricular reform (Smith, 2004; Hubball, Mighty, Britnell, & Gold, 2007).

It is increasingly the case, for example, that faculty work collaboratively and in interdisciplinary teams, rather than individually, in both their research and pedagogical practices. Academic learning communities (e.g., disciplinary, institutional, and departmental) are developing as a response to the challenging demands of the university environment and to the growing interest in the scholarship of curriculum and pedagogy in higher education (Cox & Richlin, 2004; Hubball & Albon, 2007; Senge & Scharmer, 2008). These learning communities can support the scholarly approach, critical dialogue, and decision-making required in the curricular reform process (Baldwin, 2008). They may well be the source of internal champions (or external curriculum consultants) who can provide leadership for the sustained effort involved in curriculum reform and of individuals with disciplinary curricular expertise and willingness to innovate. They may also be a starting place for the development of broad engagement with key stakeholders, including students and external colleagues, and they may provide mechanisms for effective communication and opportunities for discussion and debate, which are critical to effective curriculum reform (Devine, Daly, Lero, & MacMartin, 2007; Fraser, 2006; Hubball & Burt, 2004; Pennee, 2007; Roy, Borin, & Kustra, 2007; Warhurst, 2006; Wolf, 2007).

Complexity within curriculum development

A typical early task in the curriculum reform process is the identification of the expected learning outcomes for students undertaking the program. There are fundamental, long-standing debates about the merits of this undertaking (see, for example, Eisner, 1967/2004; Kliebard, 1975; Sumsion & Goodfellow, 2004), and disagreements may arise about the necessity or purpose of articulating prescribed learning outcomes or graduate attributes (versus emergent outcomes or instructional objectives). Articulation of the knowledge, skills, and abilities that students are expected to develop through a degree program is not easy, given that a great deal of learning would be expected to occur when numerous courses are taken over several years of study. Furthermore, a significant amount of learning is likely to occur beyond the purview of the planned curriculum.

Adding to the complexity of this task, program-level learning outcomes typically have multiple levels at which they must align (i.e., from the macro-to-the-micro and vice versa). Within the program, the learning outcomes should be reflected within the objectives for individual courses and at the micro level of learning experiences that will occur within courses. Beyond the program, the learning outcomes should reflect institutional goals regarding the general abilities of graduates, and may further have to satisfy professional and/or accreditation requirements. At the most macro level, the

program-level outcomes may need to align with governmental and/or societal expectations for higher education. Thus, there may well be competing goals at these various levels that will be difficult to resolve (Kreber, 2009).

Other problematic aspects of articulating learning outcomes include finding the appropriate level of specificity, so that the outcomes are stated in a manner that is meaningful without being excessively prescriptive and that will have some longevity as the program evolves; determining an appropriate balance between knowledge, abilities, and skill outcomes; and ensuring that the outcomes don't overestimate – or underestimate – the possibilities of what is achievable. A complicating factor here is the bountiful nature of knowledge itself. Human knowledge is vast and advancing rapidly, which makes it exceptionally difficult to select the essential learning outcomes for a program of study and equally difficult to develop authentic assessment and evaluation processes (Shavelson & Huang, 2003). Determining learning outcomes is only one phase of curriculum development. The creation of a coherent program of study requires attention to the development of the individual courses within which learning and assessment activities must be designed to address the outcomes, and to the horizontal and vertical integration of courses to optimize achievement of the outcomes (Biggs, 1999; Driscoll & Wood, 2007).

Complexity within curriculum implementation

To achieve the program-level learning outcomes, as mentioned above, many types of resources are needed to mount an effective learning-centered curriculum. Even when the gaze is narrowed to resources in the form of teaching personnel and teaching spaces, there are still numerous issues to be considered in the curriculum reform process (Kezar & Eckel, 2002; Knight & Trowler, 2000). Clearly, situations vary from institution to institution and department to department, but in research-intensive institutions curricular issues related to personnel may be particularly challenging. Here, faculty are typically hired on the basis of their research potential and are rewarded by similar criteria and often with minimal priority given within these systems to individual curricular and pedagogical contributions. Also, profound changes to teaching responsibilities may occur through the curricular reform process (Christensen Hughes, 2007). New, unfamiliar pedagogies may be required. Imbalances in the distribution of teaching demands on individuals may arise and there may be 'content' areas and methodologies that are a higher or lower priority.

The nature of the available classrooms (physical or virtual), class sizes, and course scheduling may all complicate curriculum reform efforts. Higher education programs typically rely on institutional facilities and must operate within institutional systems, which do not always support pedagogical innovations or rational curricular design (Fanghanel, 2007; Walkington, 2002). For example, large lecture theaters are less than ideal for the small group activities that might support learning outcomes such as interpersonal communication skills. Resources may be lacking to take full advantage of computer technology to support learning. Course scheduling systems based on standard three-credit hour, stand-alone courses do not necessarily facilitate the implementation of curricular elements of varying size or curriculum integration processes (Schneider & Shoenberg, 1999).

Further, the implementation of a new undergraduate degree program is typically an incremental process, with each year of the program being introduced consecutively. For an existing program, the transition will very likely be complicated by discontinuities between old and new curricula. Faculty may face temporary large increases or decreases in teaching workloads as curricular elements are added, deleted, or shifted between years, and students may have negative reactions to being exposed to an untried new curriculum or to an outmoded old curriculum.

Complexity within curriculum evaluation

Evaluation is essential to the curriculum reform process, both to inform the development stage by identifying strengths and weaknesses in pre-existing curricula, and to identify critical indicators of success for new programs and obtain feedback during the implementation stage. As with other aspects of curriculum reform, however, lack of faculty expertise and time is problematic in curriculum evaluation. Of particular concern is the inherent difficulty of evaluating achievement of the desired outcomes for learning-centred curricula (Angelo & Cross, 1993; Driscoll & Wood, 2007; Grunert O'Brien, Millis, & Cohen, 2008). Also problematic is the effort required to engage in curriculum evaluation in an ongoing, systematic, and scholarly manner. Nevertheless, curriculum evaluation may be the most familiar-seeming stage of curriculum reform for faculty, given its parallels to other forms of research that involve the use of disciplinary expertise, the systematic collection of relevant data, and critical reflection. With the addition of peer review and dissemination, such work readily enters the realm of scholarship of curriculum practice (Hubball & Gold, 2007).

Effective curriculum evaluation is a multifaceted process that requires the development of indicators for success (e.g., student ratings, achievement of learning outcomes, and/or application in the workplace), and the selection of appropriate data sources (e.g., students, faculty, administrators, alumni, and/or employers) and data collection methods (e.g., surveys, interviews, and/or focus groups). While all of these might be of interest and utility, strategic decisions will have to be made so that the evaluation process is manageable and sustainable, and so that it provides the evidence necessary to support curriculum reform and for ongoing refinements (Hill, 2007; Pennee, 2007; Zundel & Mengel, 2007).

Investigating the complexities of curriculum reform

The complex nature of contextual factors and the stages of curriculum development, implementation, and evaluation clearly contribute to the challenges of undergraduate degree program reform. To investigate these challenges from the perspective of faculty, the following research questions were designed to facilitate a comprehensive examination of the complexities of undergraduate degree program reform:

1. What are faculty perspectives pertaining to critical barriers to the process of undergraduate degree program reform?
2. What are faculty perspectives pertaining to emergent strategies to enhance undergraduate degree program reform?

Method

This study draws upon ten years of curricular consultation experiences and mentoring curriculum learning communities in multinational, institutional, and disciplinary settings, as well as curriculum research findings and strategies drawn from the SoTL literature (Baldwin, 2008; Friedman, 2008; Cox & Richlin, 2004; Harp Ziegenfuss & Lawler, 2008; Hubball & Albon, 2007; Knight & Trowler, 2000; Warhurst, 2006). The co-researchers and authors of this paper are a curriculum consultant from the UBC Faculty of Education, and the Director of the Undergraduate Program and an active member of the committee responsible for recent curriculum reform in the UBC Faculty of Pharmaceutical Sciences, both of whom are members of the portfolio assessment team for UBC's SoTL Leadership Program.

To address each of the research questions, three distinct qualitative methods were used to collect data over the period 1999 to 2009. First, data were obtained from a consultant's reflections from leading campus-wide curriculum retreats or workshop proceedings with faculty members at universities in Canada (Universities of BC 1999-2009 and Windsor 2003-2006), the West Indies (University of the West Indies 2007-2009), Dubai (University of Dubai 2009), Singapore (National University of Singapore 2009), China (Beijing and Capital Normal Universities 2009), and Wales (University of Wales 2009). Second, focus group interview data were gathered from meetings with Deans/Heads, curriculum chairs, and leadership committees from 6 different disciplinary areas (Pharmaceutical Sciences, Women's and Gender Studies, Human Kinetics, Business, Journalism, and Applied Sciences) in Canadian research-intensive universities who shared their experiences regarding critical barriers and emergent strategies in terms of faculty-specific policies and/or curriculum change processes (Bullough & Pinnegar, 2001; Hubball & Clarke, in press; Mills, 2001). Third, individual interviews and examination of respective curriculum leadership portfolios were conducted by members of the UBC SoTL portfolio assessment team with a sample of ten UBC SoTL Leadership Program graduates (1999-2009) who elected to specialize their program of study on the scholarship of curriculum practice (SoCP) during this eight-month faculty development program. In particular, curriculum leadership portfolios were analyzed for critical barriers to undergraduate degree program reform, as well as emergent strategies to enhance curricular redesign (Hubball & Pearson, 2009).

Guided by Hubball & Burt's (2004) conceptual framework for developing, implementing, and evaluating learning-centred curricula in higher education contexts, data were gathered from the above sources with respect to both research questions. In particular, participants were required to discuss and articulate critical barriers, as well as identify emergent strategies, in order to examine the perspectives, assumptions, and resultant curriculum practices that had influenced undergraduate degree program reform (Baldwin, 2008; Hubball & Clarke, in press; Merriam, 2002; McKinney, 2007; Silverman, 2000). Thus, through an active discourse between the research investigators and members of curriculum learning communities, the range of qualitative data were analyzed through a systematic and iterative process into concise and comprehensive 'categories of description' for common and isolated experiences and for major themes (Friedman, 2008; Lincoln & Guba, 1985; Senge & Scharmer, 2008).

Results

Data pertaining to the two research questions are reported together in Tables 1 through 4. The collected quotes capture a representative sample of individual comments by faculty members from multi-institutional and disciplinary settings. These quotes precede each table and provide a sense of faculty understandings of and reactions to the context of curriculum reform and the stages of curriculum development, implementation, and evaluation. These data highlight key lessons learned from research and experience over a ten-year period across multinational, institutional, and disciplinary settings in higher education. They are not intended to reflect an oversimplification of the complex and contextually-bound processes of undergraduate degree program reform, nor are they intended to reduce curriculum redesign to a 'cook-book' process. The data presented are interrelated and should be viewed holistically, with an appreciation for the iterative process of curriculum redesign where the stages of development, implementation, and evaluation are interconnected and inform each other.

The context of curriculum reform

The representative sample of comments from various individuals below and the critical barriers outlined in Table 1 reflect the mismatch between the commitment of time and effort needed for curricular reform and typical institutional reward structures, as well as leadership issues, and the difficulty of striking an appropriate balance between structure and flexibility in an undergraduate degree program. Strategies that may contribute to successful curricular reform include the provision of adequate resources and leadership, and the development of effective faculty learning communities:

...Curriculum reform entails work and time away from research or preparing for our courses, not to mention the ever-increasing amounts of admin we have to do!...We seem to go over the same old [curriculum] ground and get stuck on the same old issues... Research and publications are how we are judged, and so we should be spending most of our time on these issues...The curriculum is really a 'free-for-all' and 'dog's dinner' of mixed experiences...The curriculum is too rigid with no room for creative space...The curriculum is too prescriptive toward a reductionist and workplace agenda -it interferes with academic freedom.

Table 1. Critical Barriers and Emergent Strategies Related to Curriculum Context

CRITICAL BARRIERS	EMERGENT STRATEGIES
<p>Poor faculty motivation due to lack of incentives to engage in time-consuming, labour-intensive work of significant curriculum reform due to domination of the tenure/promotion process by research/publication performance indicators and inadequate attention to expectations for curriculum contributions in research, teaching, and service roles of faculty.</p>	<p>Obtain active support (financial, organizational, political) from administrators to promote scholarly approaches to curriculum reform. Acknowledge significant curriculum contributions in the tenure and promotion process, support participation in professional development activities related to SoCP and SoTL, and establish awards for curriculum leadership, innovative</p>

	course design, curriculum scholarship, and teaching excellence.
Perception that curriculum reform requires a significant amount of money and other resources.	Provide clear strategic priorities and adequate support and time (with external assistance when required) for curriculum leadership to effectively engage faculty in a curriculum learning community and scholarly approach to curriculum reform.
Inadequate leadership for significant curriculum reform. Perceived level of centralist 'top-down' control over curriculum issues.	Recruit effective leadership with 'political clout' to mobilize a curriculum learning community with broad representation for a curriculum reform committee, with support from the Head/Dean.
High levels of workplace stress and excessive academic workload demands.	Foster faculty learning communities as a source of mutual support. Provide collective strategies and individual opportunities to enhance wellbeing in the university workplace.

Curriculum development

The representative sample of comments from various individuals below and the critical barriers outlined in Table 2 focus on concerns regarding the failure to take a systematic and scholarly approach to curriculum development, and the difficulty of the task of articulating appropriate learning outcomes for an undergraduate degree program. Strategies for overcoming these concerns include acknowledging that they exist, obtaining expert advice on curriculum reform and learning-centred principles of teaching and assessment, and maintaining engagement and transparency in the curriculum development process through open communication:

...We've never considered 'frameworks' before for curriculum development from the higher education literature – we've usually focused on adding, taking out, or modifying courses...The curriculum has not been developed systematically or from a scholarly perspective...There is so much content to cover in courses, how can you realistically address the learning outcomes?...Now there are so many and often competing outcome requirements and demands that are placed on the curriculum, it's impractical to do them all...I never know how my course is going to end up so how can I identify learning outcomes?!

Table 2. Critical Barriers and Emergent Strategies Related to Curriculum Development

CRITICAL BARRIERS	EMERGENT STRATEGIES
Inadequate knowledge, expertise, and support (including release time) for the curriculum committee and/or Chair to effectively engage faculty in a learning community and develop a scholarly approach to curriculum reform.	Engage faculty in a curriculum learning community to identify and acknowledge key barriers (individual and collective) and develop potential solutions for curricular reform.
Lack of knowledge regarding higher education literature and theoretical underpinnings for curriculum development (e.g., how to design learning outcomes of appropriate quality and quantity, how to align multiple learning outcome templates from diverse accreditation agencies and integrate these with student learning experiences). Poor quality of existing learning outcomes, course syllabi, assessment strategies, and curriculum evaluation process.	Bring in external curriculum consultants and SoCP leaders to foster a scholarly approach to undergraduate degree program reform. Chair should develop a curriculum leadership portfolio. Convey commitment of institution and academic unit toward curriculum, teaching and learning excellence, and scholarship (e.g., through hiring priorities and reward systems). Provide informational resources and open meetings about best practices. Reexamine institutional visioning documents, accreditation requirements, and/or expectations of the field regarding learning outcomes.
Lack of skill on the part of faculty to design responsive courses, effective delivery strategies, and authentic assessment tools.	Develop strong rationale and priority for curriculum reform. Reinforce learning-centred principles and their benefits for graduates of the program. Acknowledge the complexity and challenge of curriculum redesign. Make visible available resources, constraints, and progress (e.g., through notices posted in key places, websites, e-mail communications, and verbal presentations at faculty meetings). Provide adequate assistance and support for change. Provide adequate support and on-going workshop assistance for faculty regarding learning-centred approaches to course design, teaching methods, and assessment of student learning in higher education.
Programming barriers (e.g., inflexibility within disciplinary specializations)	Use various faculty meetings, discussions, and workshop experiences to

regarding the perceived importance of coverage of or exposure to particular content and requirements for pre-requisite courses).	demonstrate that content and ability-based learning outcomes are interdependent. Content is clearly that which differentiates courses from each other, though content should be integrated with learning outcomes as the driving force for teaching and assessment. Develop an overall model of integration (vertical and horizontal) for program specializations, and provide autonomy for specializations to develop appropriate curricula and course offerings, while still driven by learning outcomes.
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Curriculum implementation

The representative sample of comments from various individuals below and the critical barriers outlined in Table 3 reflect concerns about curricular flexibility and coherence, the difficulty of implementing significant change, and the inexperience of faculty and students with learning-centred curricula. Strategies related to successful curriculum implementation include attending to the informational and developmental needs of faculty and students as they transition to new styles of teaching and learning:

...From a faculty [and student] perspective, the practice reality of our whole curriculum is mostly hit and miss...It's really difficult to engage students and adequately cover the material...Class sizes are too big for active participation...Exams are the most practical and objective way to grade students...It's very complicated and confusing for us all to figure out when/how the old program ends and the new one begins...I don't feel very prepared for introducing interactive teaching methods into my course...I find students don't really like group work assignments.

Table 3. Critical Barriers and Emergent Strategies Related to Curriculum Implementation

CRITICAL BARRIERS	EMERGENT STRATEGIES
Jam-packed curriculum lacks responsiveness and flexibility to adapt to changing and/or significant developments in the field.	Create more curriculum space (vertical and horizontal) for elective and independent study courses driven by the learning outcomes.
Lack of knowledge, expertise, and support for faculty to effectively implement curriculum reform. Poor coordination of course syllabi, learning outcomes, and course integration. Excessive reliance on traditional methods of instruction that focus on content transmission through lecture delivery and assessment through midterm and final examinations.	Engage the curriculum learning community in scholarly debates pertaining to pressing curriculum issues. Provide adequate workshop and tutorial assistance/support for learning-centred course design, student engagement strategies, and authentic assessment. Reinforce with best practices from colleagues and the SoTL literature. Promote learning-centred principles and benefits for curriculum and pedagogy in higher education.
Unclear timelines for who is responsible, when things need to happen, and how to apply curriculum goals.	Provide effective curriculum communications, overall curriculum leadership, disciplinary leadership, reporting, and dissemination in visible areas. Use multiple methods of communication to update and to elicit faculty/stakeholder input. Provide visible curriculum notice-board with flow chart events, progress reports, challenges/issues, etc.
Inadequate attention to incremental stage-specific strategies for curriculum reform. Reform is radical and transitions are abrupt, occurring over a very short period.	Be aware of the iterative stages of curriculum development, implementation, and assessment, and use stage-specific strategies for curriculum reform.
Lack of knowledge, expertise, and support for students to develop a sense of responsibility for and engagement with the learning outcomes throughout their degree program.	Provide adequate student workshop and tutorial assistance/support for implications of learning-centred course design and authentic assessment for demonstration of the learning outcomes for their degree program. Be responsive to the changing nature and growing diversity of the student body.

Curriculum evaluation

The representative sample of comments from various individuals below and the critical barriers outlined in Table 4 reflect a general lack of expertise on the assessment of achievement of learning outcomes and curriculum effectiveness and the scholarship of curriculum practice, and lack of appreciation for the ongoing nature of curriculum evaluation. As with other stages in the curriculum reform process, strategies for success include open communication and the attention to the principles of the scholarship of curriculum practice (see Hubball & Pearson, 2009, photograph on p. 1).

...We've never done a systematic and on-going evaluation of our curriculum other than the 5-year review and mad scramble to assemble all the materials when it comes around – to be honest, this is more of a relief when it is over rather than a process for on-going learning about our curriculum and on-going development strategies...We're not familiar with educational methodologies to assess our curriculum...Who is supposed to make judgments about our curriculum effectiveness?...We know that the curriculum needs to change, but there aren't any good data to support the changes...How would we know how to assess the new curriculum when it is only just beginning?

Table 4. Critical Barriers and Emergent Strategies Related to Curriculum Evaluation

CRITICAL BARRIERS	EMERGENT STRATEGIES
Lack of knowledge, expertise, and support to assess for learning outcomes and to obtain evidence to show progressive achievement by students from first to fourth year.	Engage the curriculum learning community in scholarly debates pertaining to the effectiveness of the curriculum to achieve its goals. Draw on authentic methods of assessment and evaluation of student learning outcomes in an undergraduate degree program.
Lack of knowledge, expertise, and support to systematically evaluate curriculum reform and effectiveness.	Identify indicators of success for an effective program (e.g., high levels of student applications, low attrition rate, achievement of learning outcomes, graduate leadership in the field, and reputation of the program in the field) and draw upon a wide range of research methodologies to examine curriculum contexts, processes, impacts, and/or outcomes.
Poor opportunities for faculty to reflect and provide input on curriculum reforms.	Interact with faculty regarding the curriculum reform process (e.g., via web site, e-mail, suggestion boxes in key locations, and interactive curriculum committee representatives). Consider curriculum reform as an ongoing process.

	Revisit and utilize faculty input, monitor progress, critically evaluate, and refine.
<p>Lack of knowledge, expertise, and support to conduct systematic research on the scholarship of curriculum practice to address questions such as</p> <p>in this context, what are the indicators for a successful/effective program? What research questions are required about these practices, and what sort of data collection and research methodologies are appropriate for these investigations? How can these data be analyzed? Where is it appropriate to disseminate these findings?"</p>	<p>Consider strategic collaborations with appropriate personnel (e.g., from the Faculty of Education and/or campus-wide Institute for the Scholarship of Teaching and Learning) in order to draw upon a wide range of research methodologies to examine curriculum contexts, processes, impacts, and/or outcomes.</p>
<p>Curriculum research lacks visibility and responsiveness to critical curriculum issues.</p>	<p>Curriculum research requires ongoing investigation and dissemination to celebrate curriculum achievements and progress, as well as to identify critical challenges and actions/timelines for improvement.</p>

These data from our research with curriculum chairs and faculty members in multinational, institutional, and disciplinary settings suggest that the complexities of undergraduate degree program reform make it far from an easy or quick process to undertake (see Appendix A). Rather, it typically occurs over a significant period of time and requires adequate support to effectively engage a curriculum learning community through strategic context (e.g., tenure and promotion processes, professional development support, and adequate curriculum leadership), development (e.g., engaging a curriculum learning community in the development of program-level learning outcomes), implementation (e.g., adequate leadership, support, and coordination of learning-centred course design and student engagement strategies), and evaluation (e.g., authentic assessment practices and application of SoCP methodologies) processes.

Conclusions

This article examines the complexities of undergraduate degree program reform. Faculty perspectives of critical barriers and emergent strategies for curriculum redesign are identified. Specifically, data collected over a ten-year period in multinational, institutional, and disciplinary settings suggest that inherent complexities with learning-centred curricula can be addressed through attention to contextual factors and strategies specific to the iterative phases of curriculum development, implementation, and evaluation. A common thread throughout these phases focuses on effective

leadership to engage curriculum learning communities in scholarly approaches to undergraduate degree program reform.

Although each program context is unique, the literature on the scholarship of curriculum and pedagogy in higher education can provide evidence and guidance for useful strategies that have been successfully employed in curricular reform elsewhere. Given the significant and diverse challenges of undergraduate degree program reform, a thorough understanding and awareness of the complexities of the context in which a program is situated is one strategy for success. Others addressed here include internal leadership, external expertise, broad representation, open communication, and engagement in the scholarship of curriculum practice. Further studies are required that focus on student and discipline-specific perspectives of the complexity of undergraduate degree program reform in order to reveal more comprehensive, integrative, and holistic approaches to enhance undergraduate degree program reform. Based on the findings reported here, and elsewhere in the SoCP literature, it would appear that engagement in theoretical and practical rigour to optimize learning-centred curricula is vital to the success and sustainability of efforts to reform undergraduate programs (Devine, Daly, Lero, & MacMartin, 2007; Fraser, 2006; Hill, 2007; Hubball & Gold, 2007; Sumsion & Goodfellow, 2004; Zundel & Mengel, 2007).

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Appendix A

Multi-media examples of engaging multidisciplinary faculty in multinational settings pertaining to critical barriers and emerging strategies for undergraduate degree program reform.

Aston University (UK), campus-wide workshop presentation entitled "Learning-centred undergraduate degree programmes: Canadian experience of design, implementation and evaluation"
<http://echo360.aston.ac.uk:8080/ess/echo/presentation/dc718358-0423-47a8-aa79-dfbd3568130b>