Flexible Learning Strategies in First through Fourth-Year Courses

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Flexible Learning (FL) is a pedagogical approach allowing for flexibility of time, place, and audience, including but not solely focused on the use of technologies. We describe Flexible Learning as a pedagogical approach in four courses framed by three key themes: 1) objectives and aspects of course design, 2) evaluation and assessment, and 3) challenges and improvements. Examples of strategies include: digital media-based assignments; iClicker and on-line quizzes; a librarian-created tutorial and links to copyright-cleared readings; use of Calibrated Peer Review as formative feedback; TurnItIn for self-review; wiki sites, group blogs and community work through Community-based Action Research (CBAR) conducted through the pedagogy of Community-Based Experiential-Learning (CBEL). We believe that the transferability of our experiences and findings is most relevant to educators seeking to create learning experiences that increase student engagement with complexity and uncertainty. FL approaches can help educators create learning environments that more closely resemble the contexts that students find upon graduation.

Introduction

We present how Flexible Learning (FL), a pedagogical approach allowing flexibility of time, place, and audience, including the use of technologies (Khan, 2007), is integrated within a core curriculum of 1st through 4th year courses in the Faculty of Land and Food Systems (LFS) at the University of British Columbia. We first introduce Flexible Learning, its various definitions and attributes, and describe what has been done by others. After a brief overview of the history of FL within the faculty, we share examples of FL strategies applied in four courses in the Land, Food, & Community (LFC) Series (core series), from 1st through 4th year.

Definitions of flexible learning

Society for Teaching and Learning in Higher Education (STLHE) session participants, when asked what Flexible Learning meant to them, answered with many different attributes and ideas. Posting to a live in-session wiki site, participants provided the following attributes: multiple learning strategies, stakeholders, choices of assessment, and instruction; different places and spaces such as field trips, farms, industry, and community; and keywords including student centered, flexible access, constantly evolved, adaptable, and emphasis on learning (go.library.ubc.ca/s5fnGK).

Similar to many topics in teaching and learning, participants used different terms synonymously. For example, project based learning, blended learning, mixed mode, flipped classroom, experimental, and democratic learning were all used in reference to FL.

Definitions provided by the UBC's strategic plan, *Place and Promise: The* UBC *Plan* (University of British Columbia, 2012), which emerged through

consultation with faculty, staff, students, alumni, and community members, identified improving student learning as the number one strategic priority for the future of UBC. One operational action in support of this priority included implementing the *Flexible Learning Initiative*, a campus-wide, multi-pronged strategy. UBC's *Flexible Learning Initiative* is designed to involve instructors, students, and off-campus stakeholders in enhancing the educational experience at our institution.

The *Initiative* defines FL for instructors as "evidence-based, technology-enabled teaching methods that improve the learning experience for a broader student community"; for students, it is presented as "more choice, engagement and success"; and for all stakeholders, it is offered as "an evolving portfolio of activities and resources transforming education at UBC" (flexible.learning.ubc.ca/). The UBC website also includes research papers, case studies, and other support to enhance Flexible Learning within individuals' own learning environments.

In the Faculty of Land and Food Systems (LFS), and in particular for our Land, Food and Community (LFC) core series of courses, we define FL as a set of strategies to increase the diversity of learning contexts and experiences that allow students to demonstrate course-specific learning objectives. It is an approach that enables **pedagogical** (implementation, interaction, assessment, and media of instruction) and **logistical** (location, time, and pace of learning) flexibility in teaching the LFC courses. We see a future definition of FL as "Anytime, anywhere, anyone."

Our overall objective is to prepare our students to become future professionals in the modern food system: a context recognized as complex and full of uncertainty (iPES-FOOD, 2015). We believe FL strategies create opportunities for, and support students in, learning experiences in contexts of uncertainty. As Shulman (2005) states, "a characteristic of all professions is that professions are fields in which people make decisions and act under conditions of unavoidable uncertainty. And so the very uncertainty that is essential to the pedagogy is also socializing future professionals to the conditions

of practice" (p. 13). FL strategies allow the LFC teaching teams to think beyond the lecture, lab, or tutorial, and involve students in pedagogical activities that challenge the taken-for-granted assumptions about where, when, and with whom learning occurs. In this way, students can perform in contexts that more closely mimic the settings in which professionals act.

The purpose of the Land, Food and Community (LFC) series is to prepare students to become future professionals capable of working collaboratively to address integrative food system issues, such as food system sustainability, food security, and food sovereignty. Courses within the LFC series aim to create learning opportunities that encourage students to become citizens, professionals, and leaders who understand the opportunities and obstacles to creating regional, national, and global food systems that are ecologically, socially, and economically sustainable. After completing the LFC series, students will be able to:

1. **Apply** systems approaches to **analyze** food systems issues involved in building healthy, sustainable communities.
2. **Select, critically evaluate, and integrate** inter-disciplinary evidence relating to food systems issues.
3. **Assess, plan, implement, and evaluate** actions to address local and global food systems challenges.
4. **Collaborate and communicate** effectively and professionally as members of diverse stakeholder teams.
5. **Critically reflect** on personal growth, learning, and responsibilities as professionals addressing food systems issues.

The series is comprised of six courses, from 1st through 4th year, with class sizes ranging from 27 to 300 students per course, or for multi-section courses, per section. In this paper, we focus on four courses (LFS 150, 250, 350, and 450) which integrate FL approaches to create combinations of flipped, blended, and active learning opportunities across four-year degree programs.

What Does the Published Literature Tell Us?

The term Flexible Learning (FL) has been introduced and used in higher education and professional training for more than twenty years (Nikolova & Collis, 1998). The term is often defined and used literally – increased flexibility in learning. It is purposely integrated into multiple aspects of higher education, including course delivery, logistics, entry requirements, time, locations, pedagogies, course content, assessments, and learning outcomes (Wilkinson, Forbes, Bloomfield, & Gee, 2004; Willmot & McLean, 1994). The various published definitions of FL share two common characteristics: student-centered and technology-based. While we agree that FL should be student-centered in terms that students take initiative and responsibility for their learning, our definition of FL emphasizes the flexibility of pedagogy and logistics, which may or may not include a technological aspect.

In the 1990s, several scholars developed their definitions of Flexible Learning and elaborated the connotation of flexibility. While varying in wording, these definitions are mostly student/learner-centred. For example, Van den Brande (1993) stated that "flexible learning is enabling learners to learn when they want (frequency, timing, duration), how they want (modes of learning), and what they want (that is learners can define what constitutes learning to them)" (p. 2). Some consider that Flexible Learning refers to student activities "which supplements and enhances classroom teaching; and, actively involves students in taking responsibility for planning and completing work in ways adapted to their individual needs; with appropriate support being provided where necessary" (Willmot & McLean, 1994, p. 100). At the University of Technology, Sydney, a research team implemented an innovation of Flexible Learning design, defined as a process to identify the unique learning needs (such as backgrounds and abilities) of each group of learners and match such needs with entry standards, content, learning strategies, participation times, and locations (Scott, 1996). Flexibility, in this case, is rooted in contingentlearning, which encourages the use of different strategies for different situations (Fullan, 1982).

To Khan (2007), Flexible Learning is learner-centred but encompasses interactive learning environments, internet and digital technologies, as well as instructional design principles. Khan (2007) notes that flexibility means "on-demand, anytime/anywhere high-quality learning environments with good support services" (p. 1), speculating that more institutions will offer flexible learning to students worldwide in the future.

Luckin et al., (2010) used mobile technology to create a Flexible Learning environment and explored how technology-based learning context influenced students' learning. Demetriadis and Pombortsis (2007) investigated how the level of students' learning was changed when using e-lectures to increase the flexibility of the learning experience. Dorrian and Wache (2009) introduced an online approach to Flexible Learning for a first year nursing course and evaluated the flexible delivery techniques. Chen, Bennett, and Maton (2008) reported two cases of how Chinese international students adapt to an online Flexible Learning delivery environment in an Australian university.

Several studies report positive outcomes of integrating FL strategies in their contexts: FL strategies helped students achieve learning outcomes and become autonomous learners; FL strategies also provided rich and appropriate support for students (Dorrian & Wache, 2009; Wilkinson, Forbes, Bloomfield, & Gee, 2004; Willmot & McLean, 1994). However, Chen et al. (2008) found that temporal and spatial flexibility of online learning provided limited benefits for full-time on-campus students; moreover, the text-based communication of online learning did not enhance learners' participation.

Most of the studies we found confine FL to online or mobile settings, and in single courses. We found only a few examples that consider non-online teaching strategies as FL (Khan, 2007), explore how FL strategies are used in agriculture and food-related disciplines (Rojas, 2009) and found no work done regarding how a series of courses systematically scaffolds FL strategies from 1st through 4th year.

Snapshot of Flexible Learning in the Faculty of Land and Food Systems

The LFC series emerged from traditional agriculture curricula used in the Faculty of Land and Food Systems to address challenges of the agro-food system, including the decline of agricultural extension services in Canada (Milburn, Mulley, & Kline, 2010). Changes to the curricula included the introduction of an agroecological framework, use of Problem-Based Learning (PBL) pedagogies, Community Service-Learning, Community-Based Research, and use of information technology. The new curricula also incorporated basic concepts of sustainable development and scrutinized the effect of anthropogenic activity on the environment at local and global scales.

The LFC series provides students with tools and skills needed to explore the nexus between land, food, nutrition, and health (Fan & Brzeska, 2012), while assessing the socio-economic, ecological, and technological components of agro-food systems and their impacts on communities. The use of mixed pedagogies and delivery modalities (e.g., Flexible Learning, CBEL) supported by UBC IT (it.ubc.ca/) has contributed to increasing engagement across units, promoting interprofessional responses to community priorities, and fostering social responsibility and the development of culturally appropriate food systems frameworks (Rojas, Sipos, & Valley, 2012).

Our Flexible Learning Strategies and Examples

Each course in the LFC series is designed to allow students to achieve the overall learning objectives of the series. FL approaches in each course are integrated to allow students to achieve course-specific learning objectives. We describe our FL strategies and examples framed by three key themes: 1) objectives and aspects of course design, 2) evaluation and assessment, and 3) challenges and improvements.

A selection of Flexible Learning strategies and examples used is shown in Table 1. A key goal of these strategies is to scale up from 1st through 4th year. For example, we use a common evaluation framework and shared resources with a common 'look and feel', such as librarian-created web tutorials, course websites, and tools. While resources are similar, they introduce greater complexity in each subsequent year.

Objectives and Aspects of Course Design

LFS 150 (wiki.ubc.ca/Course:LFS150), the newest addition to the core series, introduces communicating concepts of food systems and links to human and environmental health through writing. Key elements include writing argumentative essays, evaluating evidence, and searching for and citing references to support claims. It is a small-class experience (~ 27 students per section) with an emphasis on active participation. Teaching Assistants (TAs) are integral to the course, leading activities during many classes and occasionally teaching the whole class. A course coordinator supports the teaching team through curricular updates, creation of shared course material (both hard copy and online), trouble-shooting, and facilitating regular teaching team meetings throughout the term.

Students write assignments both in and out of class that include reflections, notes on readings, writing to a prompt, and a term paper with several stages. Assignments are intended to both demonstrate the value of an iterative approach to writing and to provide students with several forms of formative feedback.

Out-of-class work, including several 'Flexible Days' each term, where students work on their own and do not attend class, rely on several technologies. These include: links from the course management system to online readings, videos, and a librarian-created tutorial; Calibrated Peer Review (cpr.molsci.ucla.edu/Home.aspx) through which students give and receive anonymous feedback on peers' writing); and TurnItIn (turnitin.com/) to help

Table 1

Summary of Core Courses, Aspects of Course Design, Flexible Learning Strategies and Examples, and Related Evaluations and Assessment

Course number and name	Number of instructors/Number of TAs. Other roles noted	Number of students/Credits	Key Flexible Learning Strategies
LFS 150 Scholarly Writing and Argumentation in the Faculty of Land and Food Systems	4-5/-2-3 1 course coordinator	27 x 5 sections = ~ 140 students/3	• Out of class homework linked to in-class activities • Library copyright-cleared online readings • Some 'Flexible Fridays' • TurnItIn • Calibrated Peer Review (CPR)
LFS 250 Land, Food, & Community I	1/10 1 course coordinator	~ 300/6	• On-line modules (e.g. digital media skills & information literacy) • Field trips • 4 of 26 sessions: CBEL • 60 group CBEL projects • 108 school partners • On-line quizzes • Digital media-based assignments • Data collection, organization and representation • Technology-enhanced lecture feedback system
LFS 350 Land, Food, & Community II	2/4	~ 300/6	• 5 of 13 sessions: flipped & blended, in community • 48 group CBEL projects • 14 community partners • On-line course notes • Communication by group blogs • Digital media presentations • Wiki presentation of final reports
LFS 450 Land, Food, & Community III	1/1 1 course coordinator	~ 35 – 60/3	• 7 of 13 classes: CBAR • Course wiki for notes and resources • Reflection • Book review • 6-8 group CBEL projects • 12-15 community partners

students improve their ability to paraphrase and appropriately cite references.

The course makes purposeful connections between out-of-class and in-class activities, such as when homework (be it a reading, video, or completion of a worksheet) is the focus of activities in the next class. We have evidence from student surveys, written reflections, and assignment grades, that these examples of FL help students meet the intended course learning objectives, which includes the skills of generating ideas, viewing, reading, writing, discussing, editing, providing feedback, and summarizing (Cassidy & Chapman, 2014).

Our 2nd, 3rd, and 4th year courses are intentionally integrated with Community-Based Action Research (CBAR) projects. CBAR methodology enables communities and academics to collaborate and explore solutions to challenges identified by the community (Stringer, 2007). Instructors of each course developed food-related CBAR projects and enhanced student involvement through the pedagogy of Community-Based Experiential Learning (CBEL; Bringle, Clayton, & Price, 2009).

Student activities in CBAR projects are structured towards contributing to local food system enhancement and providing an opportunity for students to leave the physical classroom and become agents of change. The CBAR projects associated with each of LFS 250, 350, and 450 embed research processes within curricular activities, seeking to further create positive synergies between teaching and learning, research, and community service. We consider this integration a cornerstone of our Flexible Learning approach, introducing new contexts, activities, and stakeholders into the learning process.

From 2001 to 2008, students from LFS 250 (lfs-250.sites.olt.ubc.ca/) investigated issues of food security in each of Vancouver's neighbourhoods. In 2009, the course transitioned to a partnership with the Vancouver School District through the Social Sciences and Humanities Research Council (SSHRC)-funded Think&EatGreen@School project. Students conducted food literacy workshops in K-12 classrooms

as part of the projects goal to increase food-related knowledge and skills in Vancouver schools. In 2006, instructors of LFS 350 created the UBC-based Community Food System Project (CFSP), in partnerships with community food system organizations across BC, to contribute to expanding Community-Based Experiential-Learning (CBEL) opportunities focused on urban and rural food security issues. Since 2001, LFS 450 students have worked with staff across UBC through the Campus Food System project. In a consultant-like role, students meet with campus stakeholders to identify, propose, implement, and evaluate strategies to increase the sustainability of the campus food system.

In LFS 250, students begin the process of becoming food systems thinkers by analyzing global and regional food systems through theory and personal experience. By participating in interdisciplinary group work, students learn about complex food system issues and how their disciplines contribute to addressing food system sustainability, food security, and food sovereignty. Students conduct school food system environment assessments in Vancouver public schools as part of their Community-Based Experiential Learning activities.

Flexible Learning strategies in LFS 250 include on-line notes for each session; librarian-created tutorials; and an on-line course discussion forum (for within lecture and outside of class time). Four out of 26 sessions require students to meet in a community setting, including field trips to the campus organic farm, a regional dairy farm, as well as site visits to Vancouver public schools. Students complete weekly on-line quizzes before coming to lecture through the course management system (Blackboard Connect) and perform data collection, organization, and representation through the Fluid Survey's app (fluidsurveys.com/blog/iphone-and-android-mobile-app/) for smart phones or tablets.

LFS 350 (www.lfs-350a.sites.olt.ubc.ca) is designed to follow the foundation established in LFS 150 and 250 for the study of land and food systems. Using the UBC Community-Based Experiential-Learning (CBEL) projects as our main

focus, LFS 350 students research and act on food and agriculture issues of concern in partner communities throughout BC. These communities include non-governmental organizations, industry, government, and individuals located mainly in Vancouver, Richmond, and Delta. They also include smaller, rural, and remote BC communities. The overarching goal of LFS 350 is to develop a successful service-learning community of practice, to participate and respond to community needs, and to potentially contribute to healthier and sustainable communities, primarily in BC.

LFS 350 supports the development of a strong community of learners capable to engage in a participatory community food systems project, and working with an interdisciplinary, multicultural team. Students are encouraged to critically analyze land and food systems sustainability and public health issues, as well as food production systems. The CBEL project provides a range of activities to develop and apply strong communication, critical thinking, and research skills.

Similar to LFS 250, students access course information through a publicly accessible course website, which contains course notes, assignments, and community project descriptions. Students create blog entries to help organize, document, and communicate their project activities in the community. Their final reports are posted on the course website for easy access by community partners and future students. Five out of 13 course sessions are offered through a blended learning model: course content is posted on-line through the course website, freeing up time for students to work in their community setting.

LFS 450 (wiki.ubc.ca/Course:LFS450) uses an experiential learning, team-based approach to learn about food system sustainability challenges as realized on the UBC campus. It offers students the opportunity to apply skills and concepts derived from earlier coursework and area of specialization to address contemporary problems in an integrative, interdisciplinary setting. The central theme of this course is the envisioning, planning, implementation, and evaluation of projects aimed at improving the campus food system in terms of its ecological, economic, and social sustainability. In addition, dissemination of information related to these projects is viewed as critical to their success. With this theme in mind, all course assignments are intended to strengthen the required skills, either directly or indirectly.

In the main assignment, the UBC Food System Project (UBCFSP; sustain.ubc.ca/campus-initiatives/food/ubc-food-system-project), students engage with the UBC food system by acting as professional consultants to campus stakeholders. Seven of the 13 class sessions are 'un-structured' and devoted to working on the project. Students consult with stakeholders to identify the most urgent problems and devise solutions. This project employs Community-Based Experiential-Learning as its primary pedagogy to incorporate students within the CBAR context of the Campus Food System project. Other activities in the course focus on developing leadership, professional, critical assessment, and communication skills intended to support the core series learning outcomes and, most importantly, post-graduation life.

Assessment is based on a series of individual and group assignments. The former include personal reflections on leadership and a book review, designed to hone the skills of critical thought, identification of perspectives and biases, and argument construction. Group assignments include a UBCFSP Project Outline, UBC Food System Presentation, and UBC Food System Final Report.

All course materials are provided on a wiki site and include lectures, notes, past student presentations, and past final reports. These resources are a critical component to the course as they provide the historical context and trajectory of many multi-year projects. They also allow for flexibility for student learning.

Evaluation Strategies

Our understanding and experience with Flexible Learning strategies spans over a decade. FL has achieved success in our Land, Food and Community (LFC) series of courses, indicated by course evaluations and testimonies from students, the teaching team, and community partners (Rojas, 2009). Every term for LFS 250, 350 and 450, we collect feedback from community partners through community partner meetings, semi-structured interviews and surveys. The feedback encompasses student preparation, communication, leadership, group work, and professionalism. The courses' structure and content constantly evolves based on the feedback from community partners.

With the support from the Teaching and Learning Enhancement Fund (funded by UBC students), we initiated a systematic assessment of FL strategies, starting in 2014, with Behavioural Ethics Review Board approval (Certificate # H14-02143). For all four courses, we collect student written assessments and reflections, and conduct surveys and interviews (individual and focus group) for students' perceptions of how FL strategies helped or hindered them achieving the expected learning outcomes. Additionally, we plan a longitudinal study to see how students who took LFS 150 do in LFS 250, 350, and 450 compared to students who did not take LFS 150 in their first year.

We employ rubric-based assessments of student achievement of learning outcomes to objectively capture how FL strategies impact students' performance. In addition, we also collect experiences and views from the teaching teams and community partners to help understand the outcomes, opportunities, and challenges of incorporating FL strategies with CBEL, CBAR, and other hands-on initiatives. To date, we have collected more than 800 student written assessments and reflections, about fifty hours of interview records, and field notes of classroom observation. We will complete data collection in the summer of 2016, with final analyses and reporting planned for the 2016 -17 academic year.

Challenges and Improvements

Flexible Learning can enhance student learning through new ways of structuring engagement with content, assessment strategies, and communities of learners. The Flexible Learning techniques and strategies we describe allow us (and others) to continue to evolve curricula across the four years of courses within and outside of the LFC series in the Faculty of Land and Food Systems. Flexible Learning offers potential benefits to students, teaching assistants, and instructors by giving more choice and allowing all to explore which modes of learning and teaching best suit them.

We believe the transferability of our experiences and findings is most relevant to educators seeking to prepare students to engage in wicked (Hamm, 2009), or ill-structured domains of knowledge (King & Kitchener, 2004), such as sustainability sciences, or fields embedded in socio-ecological systems (Rogers, Luton, Biggs Biggs, Blignaut, & Choles, 2013). If we want our students to be able to address complex issues, we need to create learning experiences that increase their engagement with complexity and uncertainty, which tends to be limited in a classroom setting. Flexible Learning enables educators to safely expose students to diverse actors, activities, and contexts through established curricula. Further, FL approaches lend themselves to diverse assessment strategies that allow students to demonstrate learning in multiple ways. FL approaches help educators create learning opportunities in settings and processes that closer resemble the contexts in which our students will be entering upon graduation.

Next Steps

Our future plans include the following:
- Students continue to contribute to the existing online course materials and previous student

work. Existing work becomes each course's 'collective memory'.

- Incorporation of new strategies and technologies that have greater engagement with class materials. Some examples include working with a video annotation system to allow students to 'mark up' a video of a class lecture and identify which parts worked and which parts did not. Another strategy is the use of rapid and frequent polling through a twitter-like platform to encourage students to set the topics and direction of face-to-face sessions, especially in large lecture hall settings where it is challenging to receive feedback from the majority of students at any particular moment in time.
- Incorporation of rich media platforms on students' phones as alternate assignments.
- Expand communication experiences to include more story-telling skills that incorporate academic and practitioner knowledge towards improving the quality and impact of student-produced work.

While Flexible Learning techniques have been used for years, the *Flexible Learning Initiative* provides an opportunity to strategically implement new and complementary techniques and make the experience better for students and instructors.

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Acknowledgements

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