Three S's of Undergraduate Course Architecture: Compatibilities of Setting, Style and Structure

Patricia R. Robertson
Kennesaw State University
prober16@kennesaw.edu

Victor Wakeling
Kennesaw State University
vwakelin@kennesaw.edu

Abstract

Three separate baseline decisions are recommended when designing an undergraduate course prior to considering any course content. The "Three S" course design decisions include determining (1) the *setting* (on-campus, online or hybrid), (2) the learning *style* (passive or active), and (3) the learning *structure* (instructor-regulated or student-regulated). This theoretical paper identifies connections within and among these interrelated decisions and illustrates the compatible course design combinations. The paper finds that the online setting has the fewest compatible "Three S" combinations and the hybrid setting has the most compatible combinations.

Introduction

Most course design literature is focused on curriculum design or instructional design. Models emphasize how specific content, activities and assessments might be developed and delivered. (Brinthaupt et al., 2014) Often developing and preparing undergraduate courses begins with curriculum design. Curriculum design is a critical step, but there are three baseline decisions in the upfront architecture of the course to be made ahead of decisions on course content and presentation methods.

The "Three S" decisions are *setting, style,* and *structure* and the available compatibilities among them. This should be a deliberative process that considers university-imposed restrictions, instructor preferences and desired learning outcomes. Missing or abbreviating these initial steps is analogous to sequencing interior design before architecture in a construction project.

Research has been conducted based on setting and environment. Separately, work has been done to compare active versus passive learning styles. Finally, literature includes work on the merits of group-based (aka instructor-regulated) versus student-regulated learning structures. The research sourced discusses and evaluates these options but does not link the three design decisions to identify compatible combinations. This theoretical paper examines the interdependencies among these approaches.

1. Study Background

Universities and instructors have options in constructing undergraduate courses, which include three independent initial decisions:

- Setting – On-campus, online or hybrid
- Style – Passive or active
- Structure – Instructor-regulated or student-regulated

Every setting does not lend itself to all learning styles and/or learning structures. In this article, for a style or structure to be considered a viable alternative for a given setting, it is assumed that it is fully-adopted by the instructor. Incorporating elements of a particular style or structure into a course that is predominately delivered with the contrasting option will be considered an incompatible combination.

There is no specific sequencing required for "Three S" decisions. In fact, allowing users to freely approach the decisions in any order preferred fosters inspiration and innovation. This paper will address the *style* and *structure* options available for each *setting* option, recognizing that the setting is often pre-determined at the university-level.

Before addressing the setting decisions, both style and structure decisions are first discussed.

STYLE – Passive or Active

In higher education, *passive* learning is generally associated with lecture-style instruction. Students passively receive information from the instructor and learn through memorization. (Michel, Cater and Varela, 2009) In a push-pull paradigm, like two poles of a magnet, we refer to passive learning as "the instructor pushing course content to the student."

The passive learning style has been the dominant teaching method but many educators argue that students require more than a mere transfer of knowledge. (Michel et al, 2009) Craig (2015) noted that a study conducted by Freeman et al. (2014) found that student outcomes improve when "faculty do practically anything other than lecture." With the *active* learning style students are responsible for their own learning (Michel et al, 2009) and students are engaged in the process (Prince, 2004) According to Chickering and Gamson (1987), learning is not a spectator sport; students do not learn much by sitting in classes listening to teachers, memorizing pre-packaged assignments, and spitting out answers. Therefore, in a push-pull paradigm we refer to active learning as "the student pulling course content provided by the instructor."

Rather than the instructor being the focal point at the front of the room with students listening and taking notes, aka "sage on the stage" (King, 1993), with active learning students participate during classroom time through engagement and problem-solving and the instructor is the "guide to the side" (King, 1993). Active learning typically involves multiple learning modalities, including web-based learning. Students often learn foundational material prior to class so that class time is dedicated to interactive applications.

Active learning can be designed for the group or individual level. Examples of group-based active learning activities include cases, controlled discussions, debates, role playing, peer review, brainstorming, paraphrasing, networking, team writing and modeling. Tables and desks can be arranged so that students are facing one another while the instructor facilitates and moderates group activities.

Instructors can practice active learning techniques at the individual level as well. Examples include puzzles, worksheets, case studies, 1-minute papers, experiments, essential questions and problems. Finally, active learning can be a blend of group-based or individual activities. For example, students might write a paragraph on what they just heard from a video (an individual activity) and then discuss their work (a group activity).

Active learning is arguably more work for the instructor both upfront and in the day-to-day delivery

of the course. It also might involve a shift in how the instructor views both teaching and learning. Some instructors have integrated interactive elements in their lecture-style classrooms (e.g. a group-based case or an individual project), while others have substituted the entire lecture-based course with an active classroom. We consider only the latter the adoption of the active learning style.

STRUCTURE – Instructor-Regulated or Student-Regulated

The selection of the learning *structure*, the choice between instructor-regulated and student-regulated, is a separate decision. Wakeling and Robertson (2017) addressed the *instructor-regulated* structure. In this case, the instructor leads the class in lockstep through scheduled course curriculum parceled out over the semester with delivery face-to-face at a fixed time and place. Wakeling and Robertson (2017) further identified that learning is measured through a series of scheduled and sequenced assessments occurring at intervals set by the instructor throughout the semester. The student is constrained by predetermined, communal deadlines and has no flexibility to alter how the course is paced nor when assessments occur.

With the *student-regulated* structure, the student determines the pace and timing of accessing course content. (Magill, 2008) The student-regulated structure shifts accountability to the student. Learning can be enhanced if the student allocates their own study time (Tullis and Benjamin, 2011) but it requires students to make their own study decisions and first "learn how to learn." (Kornell and Bjork, 2007)

"Changes in educational approaches and technologies have created new opportunities for learners to study in unsupervised situations where they must make active decisions about their own study." (Carvalho, Braithwaite, Leeuw, Motz and Goldstone, 2016) The student-regulated structure offers students the flexibility to customize their courses to accommodate their personal preferences, both to reflect their preferred speed of learning and their need to manage their individual schedules to assign time to learning. (Wakeling and Robertson, 2017)

2. Research and Findings

For ease of illustration and in acknowledgement of the fact that the setting is often pre-determined at the university-level, this paper will address the *style* and *structure* options available for each *setting* option, commencing with the on-campus classroom.

SETTING – The On-Campus Classroom – With the on-campus classroom setting, there is a communally-set day and time to convene, an associated meeting place and a finite and defined calendar. The 'virtual' classroom is included in this setting category so long as the lecture period is scheduled and the course is delivered synchronously. Once the on-campus classroom setting is assigned or selected, the next decisions are to style and structure.

The learning *style* is automatically *passive* for traditional lecture-based on-campus university courses. The approach is time-tested and enduring and is, quite literally, 'old school.' The *structure* is intrinsically *instructor-regulated* in the case of a traditional on-campus class with the passive learning style. A passive learning on-campus classroom can only be instructor-regulated. The three elements of this long-lasting and popular on-campus classroom design are illustrated in Chart 1.

Chart 1 – Traditional On-Campus Classroom "Three S" Decisions

TRADITIONAL ON-CAMPUS SETTING	Instructor-Regulated Structure
Passive Style	X

Alternatively, the on-campus instructor could instead arc to *active* learning rather than the traditional passive learning style described above. An active learning on-campus classroom where the active

learning strategies are collaborative and group-based can also only be instructor-regulated. A group-based active learning style is not compatible with *student-regulated* learning in this (or any) setting. An individual student cannot govern his or her learning pace if restricted by the progress of the group.

An active learning classroom where the activities are assigned at the individual level may be either instructor-regulated or student-regulated. Integrating student-regulated activities into a course does not render it a student-regulated course. A lecture-based course with a group case, even if the case is completed based on the students' desired pace, remains instructor-regulated if the preponderance of the course is lecture-based.

Introducing student-regulation into the on-campus classroom requires the active learning style with individualized assignments and activities. Chart 2 expands the illustration of combinations available for an on-campus classroom.

Chart 2 – Expanded On-Campus Classroom "Three S" Decisions

EXPANDED ON-CAMPUS SETTING	STRUCTURE	
STYLE	Instructor-Regulated	Student-Regulated
Passive	X	-
Active (group-based)	X	-
Active (individually-based)	X	X

Either learning style that is combined with the instructor-regulated structure has two possible weaknesses. Goodlad (2005) wrote adult students learn at different speeds and Highland (2015) asserted that group-based instruction does not recognize the natural differences in adult paces of learning and tends to target the middle. Wakeling and Robertson (2017) noted that college students have competing priorities for their time, such as course load, family/professional obligations and lifestyle/social commitments.

Therefore, instructors might choose to offer students the flexibility to customize a course to accommodate their personal preferences as to speed of learning and when to dedicate time within their individual schedules. In other words, offering a course with the individualized active learning style coupled with the student-regulated structure.

SETTING – The Online 'Classroom' – The next setting option is the online classroom. Universities are bringing education to the student rather than bringing the student to campus. (Magill, 2008) Students are receptive to more flexible and convenient learning options for degree attainment. Typically, with online there are no or minimal required on-campus sessions and all course materials, documents, exams, etc. are delivered online via the learning management system (LMS).

If online is selected or assigned as the *setting*, the subsequent decisions are to *style* and *structure*. It might seem that the online course setting inherently utilizes the *active* learning style given the self-study environment. However, if learning is driven by narrated lectures that the student accesses and views, the learning modality continues to be *passive*. The narrated lectures serve as a direct substitute for on-campus lectures.

Active learning in the online environment is no different than in the on-campus classroom (Morrison, 2012) although it might call for less exclusivity, less complexity, and require more explanation. Writing blog posts is an example of an individualized active learning technique in the online setting. Individualized activities can be modified to include group-based work, enveloping students into a learning community. Simulations, threaded discussions, games, scavenger hunts and Q&A sessions are additional examples of active learning group-based activities for the online setting.

While practical in the on-campus classroom setting, active learning does not always translate well online. We believe that the active learning style is less robust when incorporated into an online setting. Online courses allow students discretion as to when time is allotted to the course based on individual preferences and schedules. (Wakeling and Robertson, 2017) This flexibility can delay instructor-to-student, student-to-instructor and student-to-student response times. Delayed feedback dilutes the impact of and benefit from active learning activities. Active learning is most effective when the instructor is guiding interactive activities in real time and both instructor and students are responding in the moment. Immediate feedback results in a true dialogue where ideas are vetted, opinions formed and changed, and concepts forwarded…on-the-spot. A delay in response times disrupts the natural flow of a dynamic and cohesive real-time discussion. The industry standard is to respond within 24-hours. While that sounds swift, the lack of continuity can spoil the rhythm and flow for the student. A delayed response to a question asked or comment posited can be off-point or out of context when received.

We find that the activities introduced cannot be leveraged sufficiently to qualify online classes as active learning in light of the delayed interaction intervals between instructor and students and between students. While active learning *components* may and should be included in online courses, it is difficult to craft an online course that it is fully aligned with the active learning style.

Passive learning is often the default learning style for online which opens the door for a *student-regulated* structure to be considered. The combination of passive learning with student-regulation was a combination not available for the on-campus classroom because on-campus lectures occur throughout the semester and cannot be slowed or accelerated by the student. However, this combination is available for an online course.

Online courses superficially appear to be student-regulated but only in the aspect that students are self-taught and independently navigate the course-curriculum. However, there is a caveat in how 'student-regulated' is defined. While student-regulated *learning* implies that the learner is in control of the course tempo, it is not truly 'student-regulated' if all students move through the curriculum as a group. Although seemingly counter-intuitive to characterize an online course as *instructor-regulated* and group-based, it usually is. (Wakeling and Robertson, 2017) It is instructor-regulated when students are constrained by predetermined, communal deadlines imposed through the LMS and have no flexibility to alter how either the course is paced or when assessments occur.

Wakeling and Robertson (2017) further found that there is a difference between student-regulated *learning* and a student-regulated *course*. They defined a *fully-student-regulated course* as one in which the student has full control of the timing of both learning and assessment. Distinctions exist within the structure decision. Therefore, an online course may be instructor-regulated with narrowly defined student-regulated learning or a fully student-regulated course.

It is worth mentioning that MOOCs (massive open online courses) are gaining traction in the online arena. These online courses are aimed at unlimited participation and open-access. Most offer certification programs. There are several MOOCs that offer course credit toward a degree and there are also several degree programs fully delivered via MOOCs. We consider MOOCs to offer the same "Three S" options as online.

Chart 3 illustrates the online classroom course design options, which makes a distinction between student-regulated learning and a student-regulated course.

Chart 3 – The Online Classroom "Three S" Decisions

ONLINE SETTING	STRUCTURE	
STYLE	Instructor-Regulated w/ Student-Regulated Learning	Student-Regulated Course
Passive	X	X
Active (group-based)	-	-
Active (individually-based)	-	-

The micro-decision between student-regulated learning and a student-regulated course applies to the on-campus classroom also. We previously said that the on-campus classroom can include the active learning style at the individual level with the student-regulated structure. For the on-campus setting, an instructor might opt for the active learning style coupled with scheduled content and assessments (student-regulated learning). Alternatively, an instructor could couple active learning with unscheduled content and assessments at a testing center or online (student-regulated course). Chart 4 restates the final on-campus classroom illustration.

Chart 4 – Final On-Campus Classroom "Three S" Decisions

FINAL ON-CAMPUS SETTING	STRUCTURE		
STYLE	Instructor-Regulated	Instructor-Regulated w/ Student-Regulated Learning	Student-Regulated Course
Passive	X	-	-
Active (group-based)	X	-	-
Active (individually-based)	X	X	X

SETTING – The Hybrid Classroom – The final setting option is the hybrid classroom. Many mainstream universities have endorsed hybrid courses as the best alternative between complete online and on-campus settings (Butts, 2009) Hybrid courses are becoming more common in higher education in the United States. (Scida and Saury, 2006) The catchall term 'hybrid' can include some combination of intermittent on-campus classroom sessions coupled with independent learning enabled by technology.

Once hybrid is selected or assigned as the *setting*, the decisions as to *style* and *structure* remain. Hybrids have the most flexibility of all the setting decisions. Because hybrids include significant portions of both on-campus and online sessions, instructors could exclusively adopt either learning style or genuinely employ some combination of both. This is an exception to the previously noted caveat that for a style or structure to be considered a viable alternative for a given setting it is assumed to be fully-adopted by the instructor. Hybrid instructors could use both learning styles, divvying them up across the on-campus and online environments with either style applied to either setting. A variety of structure decisions are also available.

The instructor could choose a *passive, instructor-regulated* design lecturing in class and using narrated lectures and assignments as a surrogate for on-campus lectures in the online portion. Assessments would be proctored as a group.

Alternatively, the instructor could opt for the *active* learning style such that both class time and the virtual modules exclusively utilize active learning activities. Unlike online, active learning can work in the hybrid setting because there is sufficient in-person engagement to counter the detachment obstacle previously discussed. If adopted, active learning can be either group or individually-based. This decision, however, impacts the available structure.

As in the on-campus setting, if the learning style is active and group-based, the structure is limited to instructor-regulated with activities delivered and assessments proctored as a group. The instructor can only adopt the *student-regulated* structure for active learning that is individually-based. If active learning and individually-based, the structure could be instructor-regulated (to include the *student-*

regulated learning structure) or as a *fully-student-regulated course*. The latter offers the student maximum potential flexibility in executing the course, including the timing of studying and assessments. A final option is to mix-and-match learning styles. Once passive learning is combined with group-based delivery, student-regulation of any type is no longer an option in this semi-supervised setting.

The course design decisions should consider the highest and best use of the limited classroom time. The on-campus portion typically defaults to the passive learning style. Because hybrids usually include some of the passive learning style components, this setting automatically presents the same concerns previously presented for the passive portion of the on-campus setting around differences in how adult students learn and their competing priorities for time. Chart 5 illustrates the hybrid course design options.

Chart 5 – Hybrid Classroom "Three S" Decisions

HYBRID SETTING	STRUCTURE		
STYLE	Instructor-Regulated	Instructor-Regulated w/ Student-Regulated Learning	Student-Regulated Course
Passive	X	-	-
Active (group-based)	X	-	-
Active (individually-based)	X	X	X
Passive/Active (group-based)	X	-	-
Passive/Active (individually-based)	X	X	-

A summary chart and examples of "Three S" compatibilities are offered in the Appendix. The examples illustrate the same course content delivered differently.

3. Conclusion

Prior to deciding on course content, three decisions are recommended regarding *setting*, *style*, and *structure* and the compatible combinations within them. Every setting does not lend itself to all learning styles and/or learning structures. Instructors developing new courses within existing curricula should weigh the "Three S" decisions to determine the most effective combination for the instructor's teaching style, the university's needs and preferences, and student needs and preferences. Instructors inheriting an existing course should also consider reworking the course rather than simply adopting legacy decisions. The research found that the fewest compatibilities exist among the "Three S" decisions for the online setting and the most for the hybrid setting. The on-campus classroom is between online and hybrid in terms of compatible style and structure combinations.

4. Applications for Further Research

This theoretical paper outlines a framework and methodology on which undergraduate courses could be designed. Every setting does not lend itself to all learning styles and/or learning structures. Ideally, "Three S" decisions will be driven by each one's contribution to learning outcomes for a specific discipline. This theoretical paper did not evaluate the efficacy of these decisions and their contribution to learning outcomes; rather it documented different approaches and interdependencies. Empirical research could be conducted to quantify the efficacy of each of offered combinations identified.

Abbreviations – LMS, MOOC

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Appendix

A summary chart for each setting is below. The chart includes an illustration of how the same course content could be delivered differently.

Summary Charts - "Three S" Decisions

ON-CAMPUS SETTING	STRUCTURE		
STYLE	**Instructor-Regulated**	**Instructor-Regulated w/ Student-Regulated Learning**	**Student-Regulated Course**
Passive	On March 10th and March 12th at the regular time and meeting place, the instructor presents a two-part lecture on the models presented in Chapter 3. Questions are asked and answered publicly. A quiz on Chapter 3 is administered on March 14th in the classroom.	**N/A**	**N/A**
Active (group-based)	Chapter 3 is assigned as pre-reading prior to March 10th. In session on March 10th students are divided into groups of four and instructed to list build the essential differences in the models, then subsequently create a pro-con list for each model, selecting their preferred model by the end of the session. On March 12th, student groups debate the merits of the models introduced in the chapter with the instructor moderating real-time and publicly. A quiz on Chapter 3 is administered on March 14th in the classroom.	**N/A**	**N/A**
Active (individually-based)	Chapter 3 is assigned as pre-reading prior to March 10th. In session on March 10th and March 12th students are instructed to individually list build the essential differences in the models, then subsequently create a pro-con list for each model, selecting their preferred model. Each stage of the process has a time limit. The instructor offers public instruction and guidance during the activity and a debrief afterward. Private feedback is offered to individual students during the activity. A quiz on Chapter 3 is administered on March 14th in the classroom.	Students convene on March 10th and March 12th at the designated place and time, and the instructor is present to assist students, as needed, with the assigned activity for Chapter 3. There is no communal component other than some initial announcements. The instructor roams around the room supporting student learning. A quiz on Chapter 3 is administered on March 14th in the classroom.	Students convene on assigned days throughout the semester at the designated place and time, and the instructor is present to assist students, as needed, with the assigned activities for the entire course. There is no communal activity. Students work independently and at their own pace. The instructor roams around the room supporting student learning. All course quizzes may be taken at any time (or set with a generous deadline) at an outside testing facility or in the LMS.

ONLINE SETTING	STRUCTURE	
STYLE	**Instructor-Regulated w/ Student-Regulated Learning**	**Student-Regulated Course**
Passive	From March 10th through March 14th students listen to a multi-part lecture narrated by the instructor on the models presented in Chapter 3. The module opens and closes in the LMS based on this pre-determined date range. Questions are directed individually to the instructor by email. A quiz on Chapter 3 is available in the LMS between March 10th and March 14th.	All course material is open and available in the LMS throughout the semester. There are no time constraints and students can complete all assignments and assessments when desired, choosing to front-load learning and complete all remaining course requirements early in the semester or back-load learning and defer completion of all course requirements until the end of the semester. There is no prescribed or communal activity. Assessments occur at a testing facility or in the LMS.
Active (group-based)	**N/A**	**N/A**
Active (individually-based)	**N/A**	**N/A**

HYBRID SETTING	STRUCTURE		
STYLE	**Instructor-Regulated**	**Instructor-Regulated w/ Student-Regulated Learning**	**Student-Regulated Course**
Passive	On March 10th at the regular time and meeting place, the instructor presents the first part of a two-part lecture on the models presented in Chapter 3. Questions are asked and answered publicly. From March 10th through March 14th students listen to the second lecture online narrated by the instructor. The module opens and closes in the LMS based on this pre-determined date range. Questions are asked and answered in a public forum in the LMS or privately with the instructor. A quiz on Chapter 3 is administered on March 14th in the classroom or is available in the LMS between March 11th and March 14th.	**N/A**	**N/A**
Active (group-based)	Chapter 3 is assigned as pre-reading prior to March 10th. In session on March 10th students are divided into groups of four and instructed to list build the essential differences in the models, then subsequently create a pro-con list for each model, selecting their preferred model by the end of the session. From March 10th through March 14th the groups are paired up and debate one another in the discussion board tool. The discussion board opens and closes in the LMS based on this pre-	**N/A**	**N/A**

	determined date range. The instructor comments on the postings in the tool. A quiz on Chapter 3 is administered on March 14th in the classroom.		
Active (individually-based)	Chapter 3 is assigned as pre-reading prior to March 10th. In session on March 10th students are instructed to individually list build the essential differences in the models. From March 10th through March 14th students individually create a pro-con list for each model, selecting their preferred model which is privately posted as an assignment in the LMS. The assignment tool opens and closes in the LMS based on this pre-determined date range. The instructor comments on the assignments individually. A quiz on Chapter 3 is administered on March 14th in the classroom.	Chapter 3 is assigned as pre-reading prior to March 10th. On March 10th, the instructor introduces the assignment (students to build a list of the essential differences in the models, then subsequently create a pro-con list for each model, selecting their preferred model). Students begin the assignment and the instructor remains in the classroom to assist students, as needed. There is no communal component other than some initial announcements. The instructor roams around the room supporting student learning. Students complete the assignment outside of class. A quiz on Chapter 3 is administered on March 14th in the classroom.	Students convene on assigned days throughout the semester at the designated place and time, and the instructor is present to assist students, as needed, with the assigned activities for the entire course. There is no communal activity. Students work independently and at their own pace. The instructor roams around the room supporting student learning. All course quizzes may be taken at any time (or set with a generous deadline) at an outside testing facility or in the LMS.
Passive/Active (group-based)	On March 10th at the regular time and meeting place, the instructor lectures for the first part of the session then divides students into groups of four who are instructed to list build the essential differences in the models. The instructor roams around the room moderating group activity. From March 10th through March 14th the students listen to the balance of the lecture online in the LMS and the groups are paired up and debate one another in the discussion board tool. Both the module and discussion board opens and closes in the LMS based on this pre-determined date range. The instructor comments on the postings in the tool. A quiz on Chapter 3 is administered on March 14th in the classroom or is available in the LMS between March 11th and March 14th.	**N/A**	**N/A**
Passive/Active (individually-based)	On March 10th at the regular time and meeting place, the instructor lectures for the first part of the session. The instructor introduces the assignment for students to complete individually (build a list of the essential differences in the models, then subsequently create a pro-con list for each model, selecting their preferred model).	On March 10th at the regular time and meeting place, the instructor lectures for the first part of the session. The instructor introduces the assignment for students to complete individually (build a list of the essential differences in the models, then subsequently create a pro-con list for each	**N/A**

	Students begin the assignment during the second part of the session, which is due at the end of the session. A quiz on Chapter 3 is administered on March 14th in the classroom or is available in the LMS between March 11th and March 14th.	model, selecting their preferred model). Students begin the assignment during the second part of the session. There is no communal component. The instructor roams around the room supporting student learning. Students complete the assignment outside of class, which is submitted in the assignment tool in the LMS. A quiz on Chapter 3 is administered on March 14th in the classroom or is available in the LMS between March 11th and March 14th.	
