

PEER INSTRUCTION:

FACULTY AS ARCHITECTS OF PEER LEARNING ENVIRONMENTS

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The challenge before us is to create even more powerful and effective learning experiences in which students learn by faith.... Students need opportunities to take action...where prepared students, exercising faith, step out beyond the light they already possess, to speak, to contribute, and to teach one another.... It is in that moment that the Spirit teaches.

President Kim B. Clark, BYU-Idaho Inaugural Response¹

Inspired instructors across campus are responding to President Clark's challenge to create classroom experiences that allow students to take action. The form that action takes varies considerably, but faculty members increasingly are finding opportunities to apply the BYU-Idaho Learning Model in ways that allow students to "teach one another."² As we will discuss, this does not imply that faculty are disengaged from the process of teaching. In fact, the teaching role of faculty actually deepens, focusing much more on their role as the architects of peer learning experiences. The following are just a few examples of the experiences faculty are designing for students at BYU-Idaho:

The teaching role of faculty deepens, focusing much more on their role as the architects of peer learning experiences.

- In a physics course, students prepare an assignment on the principle of constant volume flow rate and complete a pre-class online quiz. In class, their professor presents a diagram that asks them to apply the theory. Students are given the opportunity to vote on one of three answers. The instructor then divides the students into pairs where they convince each other why they believe they have the right answer. At the conclusion of the paired discussion, another vote is taken. The number who selected the correct answer nearly doubles. The faculty member calls on a student who changed his answer to the correct response to explain why he changed his vote. An active discussion ensues with faculty direction but broad student participation.
- In an English course, a professor assigns students to conduct a written thematic analysis of Dante's *Divine Comedy*. Students are assigned to publication groups where they must submit the theme of their article to an editorial board made up of peers. Students evaluate the thematic analysis based on a set of criteria that have been used with previous examples in class. All students have the opportunity to present their own work as well as to evaluate and

later edit the work of their peers. Grades are based on faculty evaluation of a student's individual article and on the overall quality of other articles in the assigned publication group.

- In a computer science course, students read a white paper discussing eight design rules for effective user interface. They complete a quiz that tests basic understanding of the material. The quiz is difficult but can be taken multiple times before class starts. In class, the faculty member reviews the questions that were frequently missed on the quiz. After the review, students are divided into teams where they are presented an actual product and asked to analyze which of the design rules is most critical to the product interface. As each team presents, there is disagreement as to which design rule should be used. The faculty member follows with further questions, allowing the teams to rework their answers before he shares the correct response with the class.

Each of these examples of peer instruction is taken from a class taught at BYU–Idaho. Each effort provides an opportunity for students to act—students prepare for classroom discussion, form their own ideas, and teach each other. And while there is significant responsibility placed on the students, the choice of peer instruction tool is neither accidental nor episodic. Each faculty member is deeply involved as the architect of the learning experience. Teachers choose the pre-class assignment and determine timing and structure (group or individual) with specific learning objectives in mind.

The purpose of this article is to present some of the work on peer instruction that is emerging as one of the many applications of the BYU–Idaho Learning Model. Much of what is captured in this article originated from inspired counsel—inaugural responses from university presidents, apostolic instruction on teaching and learning, and direct inspiration from the spirit. Some of the ideas come from research and practice occurring within the Student Peer Instruction organization at BYU–Idaho, an organization that was created in early 2007 to develop and share peer instruction approaches. Many of the ideas, however, are simply the efforts of individual faculty working within the context of their own classes, trying to find better ways to engage students in the learning process. The article will highlight some research on learning, but is not intended to provide a complete literature review. We have prepared this essay in the hope that it will serve as a useful introductory resource to a more broadly emerging effort in peer instruction. We hope readers will see connections between peer instruction and the BYU–Idaho Learning Model, that we can employ the learning model process in the future as we continue to learn together and are taught by the spirit.

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DEFINING PEER INSTRUCTION AT BYU–IDAHO

Methods for engaging peers in the teaching and learning process have been developed in a myriad of contexts. For example, peer learning efforts have been referred to externally as peer instruction,³ cooperative learning,⁴ and mutual peer tutoring,⁵ to name just a few. We will summarize the various applications of peer instruction with the following definition:

Peer instruction is a teaching method where faculty members design experiences that allow students to act by teaching and learning from each other.

Peer instruction is a teaching method where faculty members design experiences that allow students to act by teaching and learning from each other. Note that there are roles for both the student and the faculty in this definition. Students have the opportunity to take action—they teach, evaluate, interact, and share with each other in ways that require them to apply and articulate what they are learning. But in order for this student action to occur in an environment that is most effective, faculty must design the context and characteristics of those actions with specific learning outcomes in mind.

Peer instruction is one of many possible applications of the principles and processes outlined in the BYU–Idaho Learning Model. Most readers will remember that one of the three central processes in the model is “teach one another” and that the fifth principle of the model is “love, serve, and teach one another.”⁶ For effective peer teaching to occur, faculty must identify approaches that promote greater student preparation. Since there is not just one single method or pedagogy, faculty will need to find an array of tools and approaches that allow students to teach one another in ways that support their own teaching styles. The choice of which tools to use under which circumstances is part of the instructor’s role as the architect of learning experiences. And even after faculty create opportunities for peer instruction, they must closely observe, prompt, and occasionally redirect effort in ways that lead to effective learning.

To understand why so much effort is being invested in this application of the BYU–Idaho Learning Model, it is important to understand the core principles that support peer instruction:

- Students learn more when they teach
- Teaching allows students to act
- Action invites the Holy Ghost to teach

The following discussion highlights some of the theoretical and empirical evidence that supports the idea that students learn more when they teach. These ideas are supported further by our deepest motivation for developing peer instruction: when students teach one another, their decision to act links personal effort to the influence of the Holy Ghost.

Theoretical Motivation

Contemporary educational theorists and researchers consistently acknowledge varying degrees of intellectual debt to such figures as

American philosopher and educational reformer John Dewey, Swiss psychologist Jean Piaget, and Russian psychologist Lev Vygotsky.⁷ Each of these constructivist scholars argues that learning is more powerful when learners actively collaborate in the knowledge creation process.

Each of these traditions emphasizes (despite varying opinions about social, psychological, and cognitive benefits) that when learners build their own knowledge structures, retention, assimilation, and personal application are enhanced. Contemporary theorists and practitioners have developed multiple applications and combinations of this theoretical work. Even a cursory review of the educational literature reveals work in, among other things, learning communities, reciprocal teaching, active learning, problem-centered instruction, meta-cognition, cooperative learning, collaborative learning, and peer instruction.

Empirical Motivation

The Department of Peer Instruction is preparing tools to assess and enhance the effectiveness of our work in peer instruction at BYU–Idaho. Meanwhile, it is worth noting some of the external evidence of the power of active, student-centered learning principles. A prominent review of education impact studies by George Kuh and his colleagues recently concluded: “Over the past two decades a discernible shift from a focus on teaching to an emphasis on student learning has taken place in many corners. A key element supporting the shift is systematic use of active and collaborative pedagogies.”⁸ The study notes two changes that have begun to occur in higher education. First, there is an increasing focus on measuring learning outcomes (as opposed to satisfaction scores or teacher ratings). Second, this shift has led to increasing evidence that collaborative and student-centered methods are effective in improving learning outcomes. Reviewing a large survey of the empirical work, Pascarella and Terenzini observed: “The body of research on collaborative learning embraces a broad spectrum of approaches to inquiry... With some exceptions, the weight of evidence from this research is reasonably consistent in suggesting that collaborative learning approaches can significantly enhance learning.”⁹

There is a growing empirical literature that accompanies and supports peer instructional methods. For example, in a study of more than 1,000 students across nearly 60 different classes, Karabenick and Collins-Eaglin found that students in courses that emphasized collaborative learning were more likely to develop higher-order learning skills, such as comprehension and critical thinking.¹⁰ In a series of large sample studies on mutual peer tutoring, Alison King and her colleagues showed that students who used structured questioning to teach and learn from their peers recorded higher ability in knowledge construction and cognitive measures than students

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who were taught by traditional methods.¹¹ Richard Hake’s research in physics education is also compelling. In a study of more than 6,000 students in 62 introductory physics courses, students who used peer instruction techniques showed almost two standard deviations greater average normalized gain on pre- and post-tests than students who were taught through traditional methods.¹²

Spiritual Motivation

The most compelling motivation for peer instruction at BYU–Idaho remains spiritual.

While we could continue to discuss the theoretical and empirical arguments for peer instruction, the most compelling motivation at BYU–Idaho remains spiritual. In the introductory quotation for this article, we quoted President Clark’s inaugural address. In his statement that students need “opportunities to take action,” President Clark highlights one of the key principles of peer instruction: that action invites the Holy Ghost. In related terms, Elder Bednar has emphasized the vital role of the learner’s agency in this process:

A learner exercising agency by acting in accordance with correct principles opens his or her heart to the Holy Ghost—and invites His teaching, testifying power, and confirming witness. Learning by faith requires spiritual, mental, and physical exertion and not just passive reception. It is in the sincerity and consistency of our faith-inspired action that we indicate to our Heavenly Father and His Son, Jesus Christ, our willingness to learn and receive instruction from the Holy Ghost.¹³

It is not just that learners will have a better learning experience if they are given chances to act. Rather, only through appropriate action can learners invite the Holy Ghost. The spirit will then teach them, confirm the truth of the things they hear, and prompt them to teach others truths that they may not yet fully understand themselves.

In a separate setting, Elder Richard G. Scott described the role that instructors play in providing students opportunities to act:

Never, and I mean *never*, give a lecture where there is no student participation. A “talking head” is the weakest form of classroom instruction. . . . Assure that there is abundant participation because that use of agency by a student authorizes the Holy Ghost to instruct. It also helps the student retain your message. As students verbalize truths, they are confirmed in their souls and strengthened in their personal testimonies.¹⁴

Elder Scott suggests two ways to involve peers in the learning process. The first is to provide opportunities for abundant participation. This can come from classroom discussion, questioning, and personal reflection. The second is to have students teach. Elder Scott states: “We are grateful for your efforts to have students fulfill brief teaching assignments. While

that participation builds their personal skills, its basic purpose is to help the students internalize significant content.”¹⁵ Thus, students teach in order to learn. And their personal action invites the Holy Ghost to elevate the learning process itself, to teach, witness, and retain truth.

FACULTY AS ARCHITECTS OF PEER LEARNING ENVIRONMENTS

Even with the pedagogical and spiritual benefits that can accompany peer instruction, a peer-centered approach is not without risks. Experience has demonstrated that when peer instruction is unstructured, poorly designed, or lacks faculty engagement, students are less likely to benefit from the process of mutual instruction.¹⁶ In fact, many faculty worry that peer instruction implies a form of negligence or irresponsibility. They feel that they are backing away and handing over their classes to untrained and less informed students. To summarize one recent interaction from an all-employee meeting, a faculty member asked Elder Richard G. Scott: “How do we make sure that peer instruction does not simply become a case of students swapping ignorance?”¹⁷ Elder Scott’s response was two-fold. First he reminded faculty of the great potential of our students and encouraged faculty not to discount students’ power and potential when given opportunities to exercise their agency. Second, he counseled faculty to remember that structuring classroom learning in a way that allows students to teach each other should not minimize the faculty role, but actually *elevate* it.

Elder David A. Bednar described this elevated role by referring to faculty as the “architects” of a student’s learning experience: “A faculty member should be the engineer, the designer, the architect of the learning experiences; not just the sage on the stage telling people what he or she thinks they need to know.”¹⁸ What does it mean to be the architect of peer learning environments? In the examples presented earlier of BYU–Idaho faculty who were using peer instructional tools, it was clear that each of the applications was designed with a specific learning outcome in mind. For example, when the English professor teaching Dante divided up her students into publication groups with responsibility to edit the work of their peers, she was not stepping away from the review process. In many ways, the peer tools she applied expanded her role far beyond the traditional position as the classroom expert. We suggest four areas where faculty can play key roles in the architecture of peer learning environments: designing the course, structuring the classroom, creating a culture of participation, and monitoring with positive intervention.

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Course Structure and Curriculum Design

As faculty work to implement peer instruction, they should realize that effective use of these instructional resources does not occur through

unstructured application. Research in the literature of peer learning suggests that learning outcomes improve when peer instruction is designed into the overall structure of course and not simply episodically employed without an underlying architecture.¹⁹ Moreover, peer instruction is most effective in the context of problem-centered curriculum.²⁰ One application of this is through conceptual problems or case studies that encourage students to apply and discuss key principles that are being taught. Conceptual problems are being used at BYU–Idaho in courses ranging from math and physics to communications. Case studies have been used in business, nursing, and political science courses. All of these efforts become more effective when they are embedded into the overall design and structure of the course. We have provided a list of questions faculty might consider as they layer peer instruction into their course structure:

Peer instruction becomes more effective when embedded into the overall design and structure of the course.

- What peer instructional methods will help engage students in the introduction of the material?
- What peer instructional methods will deepen their conceptual learning?
- What problem-centered applications can I pair with each type of peer instructional method?
- When will the opportunity for students to teach what they are learning be most effective in achieving course objectives?
- Where in the learning cycle should I use peer instruction? Will this be a pattern in each class? Is this something we build toward? Will different tools be used at different points in the semester?
- How will I connect peer instruction with other teaching approaches I am using in my class?

Later in the article we will introduce five specific peer instructional methods, suggesting settings where they might be applied and roles for faculty within each of those contexts. More importantly, we will share several examples of how faculty members at BYU–Idaho are implementing these methods into the overall design of their courses.

Classroom Direction and Structure

While faculty need to connect learning objectives to the use of peer instruction in the overall design of their courses, within each peer activity there are specific ways that faculty can support and strengthen the learning process. The tension we observe is between two ends of the spectrum. Failure by the teacher to engage and support a peer learning activity risks the “students swapping ignorance” concern expressed earlier. However, too much intervention prevents the personal growth that arises from opportunities to exercise faith and take action. The metaphor of “peer scaffolding”²¹ has been suggested as a way to provide appropriate

balance to this tension. Faculty should provide a scaffold as the baseline structure that directs and protects the learning process, but still allows, even requires, students to engage, form their own thoughts, and teach each other.

For example, many BYU–Idaho faculty members provide opportunities for students to evaluate and direct feedback to their peers. However, the feedback is not open-ended or unstructured. Evaluation criteria are presented in class and modeled by the faculty member prior to peer feedback. Rubrics are then provided to the students that are used in the peer feedback process.²² Some faculty members ask students to teach each other what they are learning, but to maintain specific roles in the process. For example, students are assigned the role of explanation and inquiry. One student explains his reasoning to his peer. She, in turn, walks through a guided series of questions in sequence, but never provides her own explanation. Research has shown that this structured form of mutual peer tutoring increases conceptual understanding for individuals in both the explanatory and inquiry roles.²³

Creating a Culture of Participation

As faculty members introduce peer instruction into their teaching, students must make the transition to a greater level of preparation and participation. Faculty members play a key role in creating what we refer to as a culture of participation. The word “culture” is used to imply a learning environment where students and faculty develop a view that preparation and participation are a normal part of everyday classroom experience. Because so many of our students have come from classroom environments that are neither participatory nor collaborative, it is important that students be introduced to the motivation and expectations associated with peer instruction. There are a number of ways to do this, including referencing the approach in the syllabus, tying some portion of the grade to participation, and spending an early class session teaching students how to engage and participate in the course. There are many tools faculty can use to create a culture of participation.²⁴ We will list a few of these ideas here:

- Invest in students and help them invest in each other
- Foster a “safe” environment where comments are valued
- “Cold call” to check preparation and involve students
- Find ways for all to participate by rotating calling patterns
- Pre-assign participation to allow greater depth and as a tool for engagement
- Track and grade participation

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Monitoring with Positive Intervention

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Finally, it is important to remember that even when students are engaged in teaching each other, instructors are still involved and may be required to intervene or redirect the learning process. The key is that the intervention is positive and does not take away a student's responsibility to form his own ideas and thoughts. To do this, faculty members need to monitor the peer instruction process. Examples of this might include:

- observing teaching pairs and debriefing peer discussion
- requiring reports from collaborative work
- monitoring online discussion groups
- facilitating group dialogue
- redirecting discussion through questions
- correcting and explaining directly when necessary

Certainly, the structure provided can support and elevate the quality of peer instruction, but there will always remain important times for faculty members to intervene and redirect learning. For example, in a class discussion where students are debating a principle or theory, but are building consensus around a faulty conclusion, faculty need to intervene to redirect the discussion. However, these interventions can be done in ways that continue to force students to think, reconsider, and form their own knowledge structures. Though there will be times where intervention will have to be more directed than others, faculty can continue to encourage students to take responsibility for their learning even when being corrected.

USING PEER INSTRUCTIONAL TOOLS IN COURSE DESIGN






In the following section we will first introduce five peer instructional tools that faculty can use to create opportunities for students to act by teaching each other. After introducing these tools, we will suggest several ways to weave them into the architecture of a course, referencing examples that are being used at BYU–Idaho.

Types of Peer Learning Tools

There are a variety of peer instructional tools faculty can use to shape their classroom learning environments. Some of the approaches are helpful for introducing new material while other methods might deepen conceptual understanding or strengthen application. We have identified five different types of peer learning tools: peer interaction, peer response, peer collaboration, peer feedback, and peer-facilitated instruction. Each of these tools is summarized in Table 1, including a graphic representation of the student peer and faculty structural relationships. *Peer Interaction* involves activities in which students engage with each other directly (rather than through or with a faculty member). This tool is used to

engage students in a topic and it helps in making an early assessment of student understanding. This is illustrated in the diagram with students interacting (shown as dark circles) and the faculty member or facilitator observing (shown as white square). *Peer Response* is peer interaction where the faculty member or facilitator takes an active role in directing the conversation. This is shown graphically with the faculty in the center of the discussion, directing questions and dialogue to the students. *Peer Collaboration* entails grouping students to jointly solve a problem or apply a concept. The faculty steps out of the student interaction and allows peers to work together in small groups. *Peer Feedback* involves evaluation through interim peer reviews. This is usually enabled through some form of faculty-generated rubric that students use to guide feedback. *Peer Facilitated Instruction* is when a student, rather than the faculty instructor, facilitates any of the above types of peer learning. The facilitator is marked with gray triangle and the faculty member with a white square. The facilitator can be either a dedicated resource or can rotate from class to class as directed by the faculty member.

Table 1
Types of Peer Instructional Tools

Types of Peer Learning		● Student ▲ Peer Facilitator □ Instructor
	Peer Interaction Immersion and Formative Assessment: Discussion groups/boards, study groups, peer comparison	
	Peer Response Deepening and Integrating Conceptual Learning: Socratic questioning, paired teaching, case studies, concept tests	
	Peer Collaboration Joint Problem Solving and Concept Application Group assignments/quizzes, team projects, structured activities	
	Peer Feedback Expanded Evaluation through Peer Review Calibrated Peer Review, rubric-based evaluation	
	Peer Facilitated Instruction Rotated or Dedicated Student-led Instruction Student-directed lesson development	

It is important to understand the dynamics of each type of peer instructional tool in order to know when a specific learning application might be more effective than another.

As faculty design learning environments, it is important to understand the dynamics of each type of peer instructional tool in order to know when a specific learning application might be more effective than another. The following explanations will suggest when a particular tool is most effective,

what the faculty role should be, which classroom applications apply, and will illustrate implementation through BYU–Idaho examples.

Peer Interaction

When: These approaches are most effective as preparatory stages of engagement. They allow students to become generally acquainted with the material and with each other, which permits richer follow-up discussions. The tool can also be helpful with assessing the initial level of student understanding.

Faculty Role: Instructors initiate and frame the student dialogue by creating the forum, describing the topic, and inviting students to participate. After the conversation has started, they observe the interaction (either directly or from a distance).

Applications: This approach can be used with online or face-to-face activities. For example, students can engage in dialogue through online discussion boards. In a classroom setting students can be paired or placed in larger groups to discuss a topic. Other applications include study groups, brainstorming sessions, and activities that allow students to personally compare their work against other students' work.

Example: The Disciple Training Course (GS 294) taught by Rob Eaton and Henry Eyring requires that student groups research and enrich upcoming case studies. Students then post responses to questions in an online discussion board prior to meeting face-to-face in class. This fosters engagement in the case before class and permits the instructor to review the student commentary (and gauge their level of understanding) before leading the class discussion.

Peer Response

When: This tool is useful in deepening and integrating preparatory learning. It provides opportunities for students to become more engaged in the subject. Additionally, it allows the faculty member or facilitator to gauge student understanding.

Faculty Role: The instructor must design appropriate questions that allow students to teach one another. The instructor must elevate and ensure the quality of student responses to enrich and strengthen the discussion. The instructor should also create or identify appropriate problem-centered curriculum and match them with peer response tools.

Application: In this approach the instructor takes an active role directing the conversation. For example, this might include an instructor using Socratic style questions to deepen the discussion. In a similar fashion the instructor could direct case studies, role plays, student panels, and class demonstrations. Concept tests and voting are other approaches that direct the conversation by grouping students (based on knowledge disparity) so they can teach and learn from one another.

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Example: Communications 150 and 350 courses taught by Robyn Bergstrom include activities where students are required to “vote with their feet” by physically standing on one side of the room (or along a spectrum) representing their position on a question. They are then given the opportunity to convince their peers why they feel they have the correct position before a re-vote. The faculty then debriefs through discussion.

Peer Collaboration

When: After a subject has been introduced these tools can be used to inject energy, teach application, and deepen learning. This approach brings students together to jointly work on a project, make sense of a concept, or come to a consensus with a problem.

Faculty Role: Instructors must develop application materials that link to key learning objectives. They must appropriately match students, monitor progress, and have systems that assess both individual and group work.

Application: These tools include variations of group projects in which the students work together on a specific assignment. Such collaboration might take the form of wikis in an online format. Whether face-to-face or virtual, students are expected to work with their group to collectively produce something (whether it be a project, a presentation, or response).

Example: The Math 110 Course taught by Paul Johanson incorporates group quizzes to periodically review concepts. Students are placed on teams (similar to a game show) where they are allowed collaborate on answers as they compete against other teams in the class. The debate prior to converging on one answer fosters group learning and typically leads to deeper thought and conceptual reasoning.

Peer Feedback

When: When real-time feedback is important but constrained by faculty availability, this approach can benefit both the student being evaluated (with feedback) and the student giving the evaluation (through self-learning).

Faculty Role: Instructors must design practical ways in which students can be matched. Calibrated rubrics must be provided to ensure the quality of student evaluations. Incentives must be provided for students to give quality feedback.

Application: In this approach students are matched so they can evaluate one another. In some cases the feedback may be “blind” to encourage candor. Students use rubrics or other criteria designed by faculty to evaluate the work of fellow students and give feedback. Web-based software can even permit “calibrated peer reviews” that match students, train and qualify the reviewer, and automatically distribute the feedback.

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Example: An English III course taught by Janine Gilbert encourages better writing by establishing several class magazines around student interest. Every student serves on an “Editorial Board” of one of these magazines. In this role students serve as editors to provide feedback on article submissions. Grades are assigned by the instructor on the quality of the final edition of the magazine so editors have incentive to give useful suggestions to improve the quality of student article revisions. This approach has been used in more advanced courses as well, including Rod Keller’s English 450.

Peer Facilitation

When: Peer facilitation extends the reach of faculty members as student facilitators guide and monitor peer-to-peer learning. This approach deepens the learning experience of the facilitator while teaching life-long peer instruction skills. It also shows students how to teach and learn from each other and requires deeper peer responsibility for learning.

Faculty Role: The instructor must select and train student facilitators. Curriculum must be monitored through reviewing each facilitator’s teaching plans. The faculty member observes instruction to identify and focus on problem areas.

Application: Rotated student-led instruction, peer-facilitated lesson plan development, mutual peer tutoring, and dedicated peer facilitators.

Example: The Heber J. Grant Life Skills Course (GS 106), taught by April Spalding, is facilitated by six lead students who are trained to facilitate all weekly classes using peer instructional tools. The students also employ a mutual peer tutoring technique where students are assigned explanatory and inquiry roles in pairs to work through a faculty-designed set of questions that are sequenced to develop increasingly complex critical thinking skills.

Integrating Peer Tools into Course Design

The Learning Model at BYU–Idaho provides a framework to tightly integrate peer instructional tools into the overall design of a course. The learning processes of *prepare*, *teach one another*, and *ponder/prove* can be incorporated across various cycles of learning within the structure of a course. Such cycles of learning can be integrated over the span of the semester or simply used to organize a daily lesson plan.

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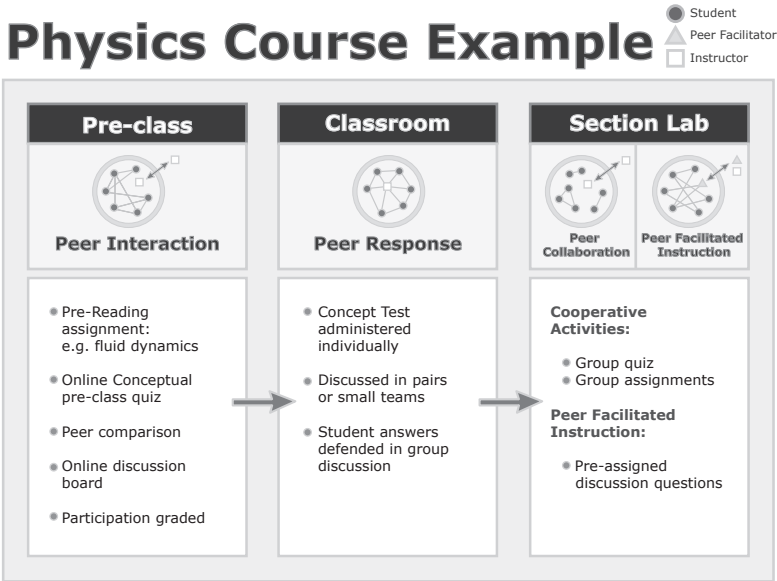
The faculty team developing the Family Foundations Course, for example, has structured a two-week cycle involving four class sessions. Each of the cycles focuses on a key principle from the document, “The Family: A Proclamation to the World.” The structure of the cycle aligns with key processes of the BYU–Idaho Learning Model. On the first session of the week, students *prepare* by focusing on the fundamental doctrines and eternal truths of the content. During the second and third

sessions students *teach one another*. In these sessions the course design draws on peer instructional tools most heavily, using various forms of peer response and peer feedback. Individual faculty members teaching the course can select from a menu of peer instructional methods relating to the key principle or create new peer approaches that fit their particular teaching style. The fourth session provides opportunities for students to *ponder and prove* more specific applications of the principle. The focus of each of these sessions affects class size, student configurations, and instructional methods.

While the Family Foundations Course provides an example of a multi-week structure across an entire semester, faculty can design peer instructional tools within weekly and even daily structure. One example of this is a physics course structure illustrated in Figure 1. This diagram demonstrates how peer instructional tools are used as an application of the Learning Model in a weekly structure. Before class, students prepare by reading and participating in online quizzes and discussions about the topic. In class, students respond individually to conceptual tests and then defend their answers in small groups before being re-tested. In section labs, peer instruction is facilitated in small groups with discussion questions and cooperative activities. The weekly cycle provides a framework to consistently integrate peer tools into the course to enhance learning.

Peer instructional tools can be used as an application of the Learning Model in a weekly structure.

Figure 1
Designing Peer Tools into a Weekly Structure



RESOURCES AT BYU–IDAHO

The Department of Student Peer Instruction at BYU–Idaho has been created to serve as a campus resource for peer learning methodologies. Specifically, the department can assist faculty with pedagogical training, on-demand resources, and joint development resources.

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Pedagogical Training

Several employees in the Department of the Student Peer Instruction are available to present peer instruction methodologies in college or departmental meetings. Individual faculty members can also enroll in topic-based workshops or they can participate in cohort-based learning groups that meet on a weekly basis (over a four to six week period). These events are being coordinated with the Faculty Development Committee. Workshop topics and schedules are updated on the department’s website at www.byui.edu/studentpeerinstruction.

On Demand Resources

A library of research on peer instruction is being gathered by the Department of Student Peer Instruction. Best practices in the field are being collected along with a database of faculty members at BYU–Idaho who are proficient with specific types of peer instruction. The department is also developing a database of students who have been trained as peer facilitators that faculty can use in labs and regular course support. Four training modules have also been developed to assist faculty in training student peer facilitators. Other presentations and review materials are available for download from the department’s website.

Joint Development Resources

In some cases, staff members from the Department of Student Peer Instruction may be “loaned” to academic departments to advise or jointly develop peer instruction into courses. Emphasis is currently on Foundations courses, but where there is significant departmental support, these resources are available for upper division courses as well.

CONCLUSION

President Clark has stated that “BYU–Idaho is engaging students in a very powerful way in teaching one another. Over time, it will become apparent that the most powerful way for the students to learn is for them to teach—they will teach to learn.”²⁵ There are theoretical and empirical arguments for peer instruction, but the spiritual motivation remains the most compelling:

- Students learn more when they teach

- Teaching allows students to act
- Action invites the Holy Ghost to teach

We have tried to emphasize that the role of faculty remains central in this process. They are the architects of peer learning environments and must determine course design, provide structure and support, create an environment of preparation and participation, and monitor learning with positive intervention. There are multiple tools and resources available at BYU–Idaho that instructors can use to strengthen and expand the many efforts that are already taking place within our faculty.

When we ask students to teach and learn from each other, we are teaching them skills that will promote life-long learning. For the rest of their lives, our students will need to know how to learn from and teach to their peers. There will not always be an expert in the room, and the more they have had experiences to learn by faith, the more they will be prepared for service in their homes, workplaces, and the Church. We believe this is part of what Elder Eyring saw when he said, “They will be natural leaders who know how to teach and how to learn.... Those graduates of BYU–Idaho will become—and this is a prophesy that I am prepared to make and make solemnly—those graduates of BYU–Idaho will become legendary for their capacity to build people around them and to add value wherever they serve.”²⁶ It is our hope that we can work together to fulfill that inspired vision as we learn how to better enable our students to teach and learn from each other. ☺

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NOTES

- 1 Kim B. Clark, “Inaugural Response,” (BYU-Idaho Inaugural Ceremonies, October 11, 2005).
- 2 Brigham Young University-Idaho Learning Model, September 2007, p. 15-17.
- 3 Eric Mazur, *Peer Instruction: A User’s Manual* (Upper Saddle Valley, New Jersey: Prentice Hall, 1997).
- 4 Robert E. Slavin, *Cooperative Learning* (Boston: Allyn and Bacon, 1995).
- 5 Alison King, Anne Staffieri and Anne Douglas, “Mutual Peer Tutoring: Effects of Structuring Tutorial Interaction to Scaffold Peer Learning,” *Journal of Educational Psychology*, (1998): 134-152.
- 6 Brigham Young University-Idaho Learning Model, September 2007, p. 15-17.
- 7 Dewey, John, *Democracy and Education* (New York, NY: Macmillan, 1916). See also Lev Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*, (Cambridge, Massachusetts: Harvard University Press, 1978). See also Jean Piaget, *The Development of Thought: Equilibration of Cognitive Structure*, (New York, NY: Basic Books, 1977[1928]).
- 8 George Kuh, Jillian Kinzie, John H. Schuh, Elizabeth J. Whitt, and Associates, *Student Success in College: Creating Conditions that Matter* (San Francisco: Jossey-Bass, 2005), 69.
- 9 Ernest Pascarella and Patrick T. Terenzini, *How College Affects Students. Volume 2: A Third*

Decade of Research (San Francisco: Jossey-Bass, 2005), 5. Pascarella and Terenzini describe their work as “An attempt to synthesize comprehensively the new research evidence on the impact of college on students” (5). Their research is organized around six questions regarding student change as a consequence of postsecondary education:

1. What evidence is there that individuals change during the time in which they are attending college?
2. What evidence is there that change or development during college is the result of college attendance?
3. What evidence is there that different kinds of postsecondary institutions have a differential influence on student change or development during college?
4. What evidence exists on effects of different experiences in the same institution?
5. What evidence is there that the collegiate experience produces conditional, as opposed to general, effects on student change or development?
6. What are the long-term effects of college? (9)

It is, in short, an attempt to document the impact of their work in the lives of students.

- 10 Stewart Karabenick and Jan Collins-Eaglin, “Relation of Perceived Structural Goals and Incentives to College Students’ Use of Learning Strategies,” *Journal of Experimental Education* 65 (1997) : 331-341.
- 11 Alison King and her colleagues have conducted a number of interesting studies on using structured questions in the peer tutoring. See Alison King, “Facilitating Elaborative Learning Through Guided Student-Generated Questioning,” *Educational Psychologist* (1992) 27: 111-126. See also Alison King, Anne Staffieri and Anne Douglas, “Mutual Peer Tutoring: Effects of Structuring Tutorial Interaction to Scaffold Peer Learning,” *Journal of Educational Psychology* (1998): 134-152.
- 12 Richard R. Hake, “Interactive Engagement Versus Traditional Methods: A Six-Thousand-Student Survey of Mechanics Test Data for Introductory Physics Courses,” *American Journal of Physics* (January 1998): 64-74. Note also that the field of physics is an interesting case study of how educators can transform a discipline through applied research and practice. In the mid-1980s, Halloun and Hestenes conducted a series of studies demonstrating that physics students performed poorly on pre- and post-tests when instruments measured knowledge gains in conceptual material. Students could memorize the formulas, but did not seem to understand the underlying concepts. Several groups of faculty began experimenting with peer instructional techniques including concept tests designed by Eric Mazur and others. Internal departmental studies began to show dramatic improvements in conceptual understanding. These were subsequently followed by large sample studies, of which the earlier mentioned Hake study was most prominent. See Ibrahim Abou Halloun and David Hestenes, “The Initial Knowledge State of College Physics Students,” *American Journal of Physics* 53 (1985): 1043. See also Catherine H. Crouch and Eric Mazur, “Peer Instruction: Ten Years of Experience and Results,” *American Journal of Physics* (September 2001): 970-977.
- 13 David A. Bednar, “Seek Learning by Faith,” *Ensign* (September 2007), 64.
- 14 Richard G. Scott, “To Understand and Live Truth” (Address, CES Religious Educators at the Jordan Institute of Religion, February 4, 2005).

- 15 Ibid.
- 16 See Alison King, "Facilitating Elaborative Learning Through Guided Student-Generated Questioning," *Educational Psychologist* 27 (1992): 111-126. See also Alison King, Anne Staffieri and Anne Douglas, "Mutual Peer Tutoring: Effects of Structuring Tutorial Interaction to Scaffold Peer Learning," *Journal of Educational Psychology* (1998): 134-152. A more critical review of unstructured classroom teaching is provided by Paul A. Kirschner, John Sweller and Richard E. Clark, "Why Minimal Guidance During Instruction Does Not Work: An Analysis of the Failure of Constructivist, Discovery, Problem-Based, Experiential, and Inquiry-Based Teaching," *Journal of Educational Psychology* (2006): 75-86.
- 17 Richard G. Scott, (Address, BYU–Idaho All-Employee Meeting, Rexburg, ID, July 11, 2007).
- 18 David A. Bednar, (Address, BYU–Idaho President's Question and Answer, Rexburg, ID, November 16, 2004).
- 19 This is discussed by Eric Mazur and his colleagues. See Catherine H. Crouch and Eric Mazur, "Peer Instruction: Ten Years of Experience and Results," *American Journal of Physics* (September 2001): 970-977. See also Eric Mazur, *Peer Instruction: A User's Manual* (Upper Saddle Valley, New Jersey: Prentice Hall, 1997).
- 20 While there are many streams of research that emphasize the value of problem-centered learning, we have found the research of M. David Merrill a useful call for integrating peer instructional tools with conceptual problems. See M. David Merrill, "First Principles of Instruction," *Educational Technology Research and Development* (2002): 50(3), 43-59. See also M. David Merrill, "Task-Centered Instructional Strategy," *Journal of Research on Technology in Education*, (2007). Examples of problem-centered learning include case studies, conceptual problems, real-world applications, and simulations where students must activate and apply conceptual knowledge.
- 21 Alison King, Anne Staffieri and Anne Douglas, "Mutual Peer Tutoring: Effects of Structuring Tutorial Interaction to Scaffold Peer Learning," *Journal of Educational Psychology* (1998): 134-152.
- 22 A rubric is a tool faculty can use to guide peer feedback. Rubrics can range from simple tools such as a list of questions students apply when providing feedback to detailed criteria for evaluation. Rubrics may also include more complicated scoring templates and be employed through student training. Third-party software resources have built-in web tools that can assist with this process, including Calibrated Peer Review.
- 23 Alison King, Anne Staffieri and Anne Douglas, "Mutual Peer Tutoring: Effects of Structuring Tutorial Interaction to Scaffold Peer Learning," *Journal of Educational Psychology* (1998): 134-152.
- 24 See Peer Facilitator Training, "Module 3: Peer Facilitator Skills" available on the Student Peer Instruction website at www.byui.edu/studentpeerinstruction.
- 25 Kim B. Clark, "Realizing the Mission of BYU–Idaho: Developing Disciple-Leaders" (All Employee Meeting, Rexburg, ID, May 10, 2007).
- 26 Henry B. Eyring, "A Steady, Upward Course" (BYU–Idaho Devotional, Rexburg, ID, September 18, 2001).