WisCEL Course Review Summary: 2014 – 2015 Academic Year

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The WisCEL Course Review asks instructors to respond to questions in nine areas relevant to teaching and learning in WisCEL. Fall semester 2014, 22 WisCEL instructors responded to the course review survey administered through Qualtics. In fall 2014, 22 instructors completed the survey and in the spring semester 2015, 20 course instructors and TAs completed the survey. ¹

2014-2015 Fall and Spring Semester WisCEL Courses

In the fall and spring semesters of 2014-2015, a total of 39 courses were held in College and Wendt WisCEL Centers. In 2014-2015 academic year, a total of 4,130 students were enrolled in WisCEL courses.

- **Fall 2014:** There were 11 Engineering courses, 4 Math courses, 5 Freshman Interest Group (FIG) Seminars, one Afro-American Studies course, and one Counseling Psychology course was held in Sterling Hall CLC. The courses ranged in enrollment from 18 students to 490 students. A total of 2175 students were enrolled in WisCEL courses in College Library and Wendt Commons during the Fall 2014 semester.

- **Spring 2015:** There were 12 Engineering courses, 3 Math courses, an English Course, a cross listed Music/Jewish Studies course, and a Statistics Course. The courses ranged in enrollment from 8 students to 434 students. A total of 1955 students were enrolled in WisCEL courses in College Library and Wendt Commons during the Spring 2015 semester.

Course Design

In both Fall 2014 and Spring 2015, the majority of the instructors characterized their course designs as a combination of Active, Blended and Flipped instructional models.

- **Fall 2014.** Fifteen instructors characterized their course design as an Active Learning model, with 5 of those courses also being Blended and 10 also being Flipped. There were no courses that used a solely Blended design. Twelve courses reported using a Flipped instructional design. Four courses took advantage of a Hybrid course structure.

- **Spring 2015.** Twelve instructors characterized their course design as an Active Learning model, with 7 of those courses also being Blended and 7 also being Flipped. There were two courses that used a strictly Blended design. Eleven courses reported using a Flipped instructional design. Three courses took advantage of a Hybrid course structure.

Active learning course design models and instructional strategies were the most commonly referenced as being the most effective by WisCEL instructors in both fall and spring semesters.

- **Fall 2014.** The following lists the most frequently cited active learning strategies and why they were deemed to be effective by WisCEL instructors in fall 2014:

  - **Group work:** Specifically designed small group work (discussions, exercises, problems and projects) encourages collaboration, peer learning, and creativity; allows for peer and expert feedback and support; surfaces misconceptions early and develops collaboration skills.

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¹ Please note: The survey consists of a variety of questions in which respondents are asked to “Check all that apply” or to write short answers. The results presented in this report summarize information provided by WisCEL instructors in surveys from both semesters. As some instructors taught both semesters, and respondents could check more than one item per question, the results in each area include some duplication and item numbers do not always add up intuitively.
• **In-class exercises/problem-solving**: Gives students opportunity to experience real and complex problems, practice the work, apply ideas, and struggle with solutions while under expert guidance.

• **Feedback**: Instructors provide expertise and assist students in “real-time,” immediately addressing misunderstandings, and allows for more complex problems to be presented and mastered by students.

• **Limited or no lecturing**: Reduced in-class “lecturing” or no lecturing at all increases students preparation before class and improves in-class participation, allows for effective use of WisCEL classrooms.

• **Differentiated instruction**: Gives students the responsibility to work on examples and learn in class in their own way and at their own pace (e.g., multiple tries), resulting in better conceptual understanding and knowledge retention. Instructors can differentiate instruction for individuals and small groups.

• **Incentives and scaffolding**: Active learning design and strategies (i.e., videos before class prepare students to understand in-class work, and in-class work prepares students for homework) act to scaffold learning and incentivize student discipline, participation, limiting procrastination and encouraging active learning “buy-in” and success.

• **Student sharing**: Student collaboration through peer-to-peer support, mini-presentations, discussions, and small group assignments; increases in-class participation and interaction.

Spring 2015. The following lists the most frequently cited active learning strategies and why they were deemed to be effective by WisCEL instructors in spring 2015:

• **Group work**: Small group and team work develops technical and professional skills; allows for active, hands-on problem-solving and application, spontaneous collaboration among students; and students receive immediate feedback from peers and instructors.

• **In-class exercises/problem-solving**: Promotes discussion and student learning, gives students opportunity to apply concepts in class with peer and instructor assistance, students can spend more time-on-task, and reinforces ideas learned online or at home through in-class problem-solving.

• **Online videos, quizzes and problems/exercises**: Use of online delivery of course content (e.g videos, e-textbook) outside of class; in-class strategic quizzing (i.e, quiz timing to incentivize students to come to class, or a “post-quiz” to reinforce days tasks); and online problems/exercises delivered in-class were cited as effective strategies for motivating students, developing understanding of abstract concepts, and maximizing in-class time for interaction, application, coaching and feedback.

• **Active learning environment**: Classroom resources (technology, mobile whiteboards, and round tables) provided an environment that supported group work, spontaneous collaboration, feedback and relationships among and between students and instructors.

• **Feedback**: Feedback was referenced as an effective set of strategies integrated throughout active learning course designs in WisCEL. In Spring 2015, instructors responded that feedback was an important aspect of each class period – from online quizzing, exercises, and homework to in-class collaboration, questioning, explaining, and coaching (student-to-student, in groups, and instructor-to-student).

**Collaboration Strategies**

Spontaneous student-to-student interactions was the most frequently cited collaboration strategy, used in 31 out of 39 courses. Small group collaboration was used in 29 courses, of which 15 used assigned student groups. Use of questioning was common in all classes, frequently initiated by students in 28 courses and by instructors in 25 courses. Whole class discussion and in-class student reporting/presentations were the least cited collaboration strategies.
Fall 2014 Collaboration Strategies

- **Questioning.** Student-to-Student and Student-to-Instructor questioning were cited as the most effective collaboration strategies. Instructors reported this mix of collaborative strategies allowed students to work through obstacles in problems and have reinforcement from an expert. Instructors had the opportunity to “clarify and guide” students with strategies and solutions.

- **Spontaneous peer-to-peer and group collaboration.** Among student-to-student interactions, instructors preferred spontaneous peer-to-peer and group collaboration. Spontaneous collaboration was credited with:
  1) Distributing the instructional load,
  2) Explaining concepts from multiple perspectives,
  3) Lessening the threat of cheating and inhibition of consulting peers,
  4) Creating a more social work environment,
  5) Targeting the learning challenge of the student asking questions (and assisting the student to move beyond the challenge),
  6) Increasing opportunities for instructor responses (coaching and feedback),
  7) Allowing learners to raise questions and doubts,
  8) Changing relationships (seeing peers as resources and increasing interactions and sharing), and
  9) Focusing student reading, discussion and comprehension.

- **In-class or instant feedback.** Giving and receiving instant peer and instructor feedback were mentioned as being an effective part of collaboration.

- **In-class collaboration.** In-class collaboration on problem-solving, exercises, team assignments, case studies and homework were effective in that it: 1) set expectations, 2) increased peer interaction and questioning, 3) created collective learning, 4) improved student sharing, and 5) helped students master the class learning objectives.

Spring 2015 Collaboration Strategies

- **Spontaneous peer-to-peer collaboration:** Among student-to-student interactions, 9 instructors cited unstructured, spontaneous peer-to-peer strategies as being the most effective. Spontaneous collaboration was credited with:
  1) Peer-to-peer teaching/learning
  2) Students prefer ask questions and learn from each other
  3) Knowledgeable students explain concepts and justify solutions to less knowledgeable students
  4) Allows opportunities for instructor one-to-one coaching and feedback,
  5) Encourages organic questions, explanations, justifications, and understanding.

- **Structured small group collaboration.** Seven instructors found that more structured small groups promoted diverse teams, encouraged students to be engaged, develop understanding and improve by consulting with their peers and instructor coaching as needed.

- **Structured, prescribed, randomized, scaffolded problems:** Four instructors noted the effectiveness of structured in-class problems that encouraged students to collaborate, and when they got stuck to seek help from each other.

Feedback Strategies

A combination of in-class feedback (instant, immediate, and real-time feedback) was reportedly used by all respondents to make a difference in their teaching. A total 36 of the 39 respondents from both semesters reported frequently using instructor-to-student feedback, followed by 32 who noted frequently using peer-to-peer feedback. 28 respondents noted that they relied on both student and instructor feedback. Feedback was also delivered online, through CMS, software, and social media; 25 noted also using online feedback strategies.
Immediate and instant feedback strategies deemed most effective were delivered online, through CMS, software, and by instructors-to-students as well as peer-to-peer.

- **Immediate and instant feedback** was cited as keeping students on topic, engaged, and on track. By verifying understanding, prioritizing and focusing on coursework and concepts, identifying mistakes early, and keeping students interested and motivated.

- **Student or peer feedback** was said to help students develop understanding, identify errors and mistakes early, support problem-solving, and improve group and team progress on projects/assignments. Student-provided feedback to their peers promoted student questioning, discussion and self-correction.

- Instructors used **multiple forms of feedback**: online and spoken comments, iterative exercises on CMS or other software (online problems designed to scaffold learning with multiple tries) and responding to student’s questions with questions. In-class coaching provided instructors opportunities to catch errors early and guide students in their reasoning, application and problem solving.

  - **Online feedback strategies**
    - Instructors’ cited the role of Moodle, Matlab, chat, CMS, peer mentors, and WisCEL exercises as important **tools and technology for providing feedback**.
    - Use of **frequent online quizzes** was cited as an effective feedback strategy that prepared students for in class work, helped students stay on-track and current with class work, and promoted discussion and learning.
    - Immediate feedback from **online problems or exercises** in CMS software provided students with multiple opportunities to increase their understanding, eliminated misconceptions early on, helped students check for understanding, exposed students to more content and ideas, allowed self-pacing and motivated students with low stakes points.

- **Instructor or coaching feedback** helped both students and instructors by surfacing misunderstandings, promoting discussion and ensuring students understood concepts.

  **Class Culture**

Many respondents had positive responses about class culture and community in WisCEL courses, noting that there is a very different climate in WisCEL than in a traditional lecture courses, and that the experience is different for students and for instructors alike. Spring 2015 respondents were similarly positive about the community and culture in their WisCEL courses, although a few remarked that the more interactive approach to learning and open physical environment did not seem to work for all students.

- **Instructors’** liked teaching in WisCEL for the flexibility of the room and physical space, the genuine connections that develops between instructors and students, group learning that encourages sharing or questions and engagement, and the environment of a “strong-active/excited-engaged” community.

- For students it is a flexible, interactive learning experience where they can work and learn in groups in class, allowing them to be friendly and collaborative and get to know their peers and instructors.

- **Several instructors** referred to their WisCEL course culture as “collaborative, active and fun,” where there was an “intense focus on and expectation for learning, yet relaxed” atmosphere that engaged students. Others noted that class time was more student-centered and the culture was characterized by interaction, activity, and lower stress that led to students feeling more comfortable, talking more and developing relationships with fellow students and instructors.

- **In contrast to the climate** in standard lecture style classes, instructors commented that the WisCEL space eases student stress and crowding; mobile/round furniture facilitated student interaction, group forming and relationships, and that the class environment was free of the “instructor-focus”, distance and barriers of lecture halls. Instructors observed that students felt less inhibited to ask questions, and less embarrassed to participate as they became interacted and became comfortable with their peers.
While the WisCEL active-learning culture and environment was a “natural social environment” for most students, a few instructor’s voiced concerns about inclusion of the “introverted student”. A few students remain withdrawn from groups, are reluctant to fully participate, can find isolation in the software, or choose to “hide” at remote tables (e.g., in room 410A).

**Instructional Tools and Technology**

Thirty-four out of 39 instructors reported WisCEL- provided computers as the technology they used most frequently in their WisCEL course and 31 instructors reported using the instructor podium for “whole room projection”. A more modest number of instructors reported frequent use of the document camera (18), SMART monitor (16), mobile whiteboards (22), fixed whiteboards (9), and mobile furniture (11). Only 7 instructors asked students to “bring their own device” and only 6 instructors brought their own computer.

When asked which instructional technology software they used most frequently, 26 used a CMS such as Moodle or Learn@UW, 16 used the internet, 12 used proprietary curriculum software, and 10 used InfoLab (UW – licensed) software and 4 used engineering software available through COE/CAE. Others responded that they used software and social media such as Macrosim, WordPress and Twitter, or open source software.

Fall 2014 instructors mentioned that the most effective instructional technology tools used in their WisCEL course were CMS (Moodle and Learn@UW), the ability to project videos (for whole class use and student presentations), use of computers for in-class exercises, quizzes, and homework, especially with creative questions/problems that allowed for multiple chances, practice, instant feedback and interactive options. Spring 2015 instructors mentioned that the most effective instructional technology tools used in their WisCEL course were CMS software (Moodle and Pearson MyMathLab), document cameras, and mobile whiteboards.

- **Fall 2014.** Seven instructors wrote about their use of Moodle (CMS) noting that the software “enabled them to schedule and implement online videos, quizzes, in-class exercises, homework and exams”. Others noted Moodle’s role in providing a course structure, a platform for course materials distribution, interactive in-class exercises, promoting learning, as well as its flexibility and quiz delivery options.

- **Fall 2104.** Two instructors noted that Learn@UW was useful for in-class discussion posts, homework assignments and instructor feedback. One commented that students were familiar and comfortable with using Learn@UW.

- **Fall 2014.** Three instructors noted they used the document camera in math and statistics courses, noting that it was useful for doing problem demonstrations and presenting student solutions.

- **Spring 2015.** Five instructors wrote about their use of Moodle (CMS) crediting as most useful the features for designing problems, quizzes and exams; automatic grading; randomization of problem assignments; immediate feedback; designs to scaffold learning; and the ability to have all course materials in one central location.

- **Spring 2015.** Math course instructors praised the Pearson MyMathLab software for administering homework, quizzes and exams, keeping students on task, and the administration features for automatic grading and tracking student’s efforts and status. They also mentioned the effectiveness of having students learn material and take exams in the same software.
Online Videos/Video Lecturettes

Eleven courses used video lecturettes prior to class to delivery course content. Seven courses projected videos at times during class (to provide demonstrations, examples, as a discussion starter or in lieu of lecture). Ten courses used videos as optional study aids.

Course Management Systems

In the 2014-2015 academic year, 36 WisCEL instructors reported using a CMS in their WisCEL course. Of those, 21 used Moodle, 8 used Learn@UW, and seven used a proprietary software such as Pearson MyMathLab.

Features of CMS used most frequently by WisCEL instructors were: to organize and deliver course materials (28), for homework (27), quizzes and exams (23), grades (25), communication with students (17), in-class problems (16), course administration (12), and file storage (12).

- **Fall 2014.** WisCEL instructors commented about the effectiveness of CMS features:
  - Automatic grading of in-class work, homework, quizzes and exams
  - In-class exercise delivery
  - Central repository for video lectures, documents, course resources, and comments
  - Relentless quizzing with each small assignment
  - Student electronic submissions of papers and comments
  - Sending mass emails, posting news, and updates to class
  - Circulation of music mixes

- **Spring 2015.** WisCEL instructors commented about the effectiveness of CMS features:
  - Automatic grading of in-class work, homework, quizzes and exams
  - Posting and accessibility of videos, syllabus, materials, calendars, lecture notes etc.
  - Central repository for all course materials and activities.
  - Quiz features (i.e., randomization, instant feedback, multiple tries).
  - Feedback to students – in class, constant, immediate.

- Two instructors were disappointed with their use of Moodle (“convoluted, not well-suited for tracking student progress and unstable”) and Learn @UW (“I hate the D2L gradebook”).

Instructor/Course Development and Support Resources

When asked about what additional course development and support services they needed, most instructors responded that they wanted access to more instructional and course design expertise and support (17) and/or course and student outcomes research support (19). In fall 2014, 10 instructors responded that they wanted additional instructional technology support, but only 4 indicated they wanted this support in spring 2015.

The majority of WisCEL instructors preferred holding WisCEL Instructor Workshops once each semester.

When asked about what improvements would make WisCEL more effective for teaching and learning, five respondents gave very positive responses about the services, resources and staff provided by WisCEL and encouraged WisCEL to continue doing what it is currently doing. Nine instructors answered that they had “No suggestions at this time” or “None”.
When asked about what improvements would make WisCEL more effective for teaching and learning, instructors made the following suggestions:

- Improve computer security and lockdown options for computerized testing in coordination with campus.
- Improve student desk assistance with technology troubleshooting and opening procedures for first class of the day.
- Keep student computers updated and improve their reliability/functional consistency.
- Create more WisCEL Centers on campus.
- Provide an on-site staging and materials storage area for instructors.
- Provide a more seamless “one-stop” access for instructional design and instructional implementation in WisCEL.
- More pedagogical support for inquiries on using CMS (especially Moodle) group work, in-class activities, how to incorporate technology in instruction, and incentives for student productivity.
- Find a better solution for display of complex STEM problems (whiteboards are not visible to whole room and the document camera does not hold enough information).

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