**You Can take it with You:**

**Emerging Themes from fall 2014 Tablet Assessment Reports**

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# Introduction

Assessment activities are efforts to harvest evidence of student learning in order to judge whether the curriculum and pedagogy are doing their job of facilitating student learning. The introduction of the tablet into the mix of teaching strategies and curriculum has the potential to increase student learning. When its functionality is exploited, it allows for a variety of new instructional modes, the use of new curriculum, and a variety of new student assignments. The tablet assessment project has been designed in order to gather evidence as to whether and in what cases the new instructional modes, new curriculum, and new assignments afforded through the tablet can be used to enhance student learning.

As the number of tablet sections has grown over the last three semesters from fall 2013 through fall 2014 we have also increased our opportunities to improve faculty use of the tablet functionality, increased the range of pedagogical use of the tablet, increased student familiarity with the tablet both as a device for learning and a device for *doing*. What have we learned about the impact of the tablet on student learning? The following report on fall 2014 tablet assessment will highlight emerging themes which have been culled from the robust number of assessment reports and provide a sampling of the faculty evidence submitted in support of both their commentary and their conclusions regarding the impact of the tablet for student achievement of learning outcomes, curriculum, and pedagogy in their classrooms.

Whether stated for an assignment, course, or program, student learning outcomes articulate what faculty wants their students to achieve as a result of the variety of learning opportunities and experiences afforded to the student. Student learning outcomes state specific knowledge to be learned, or specific skills or abilities to be developed. Because of this core role, student learning outcomes control curriculum and pedagogy in important ways. Once a student learning outcome is identified, curriculum can be developed that will provide opportunities for students to learn material or practice for the acquisition of skills, and faculty can design pedagogy intended to help the students achieve stated outcomes.

When the tablet project began in fall 2013, faculty tried to, variously, assess the impact of tablet use on achievement of assignment learning outcomes, course learning outcomes, or program learning outcomes. As a consequence of fall 2013 and spring 2014 assessment results, the team learned that the impact of the tablet on achievement of course and program learning outcomes was confounded by the noise of too many variables affecting learning, and that much of the noise could be eliminated by focusing on the impact of the tablet on learning in smaller modules. We could see that **assessment of** **assignment learning outcomes** was the most effective strategy for gathering evidence regarding the impact of the tablet for student learning. As a consequence, for fall 2014 we recommended to faculty that they design assessments at the assignment level. Faculty remained able to indicate the implications of these assessments for broader course, program, and university level outcomes with which they might be aligned. We also required that faculty participants design direct assessment plans which utilize student course work, the most direct evidence of student achievement available to us, and not rely on indirect assessment through student surveys or other methods of self-reporting. These direct “micro-assessments” have proven to be successful for isolating the impact of using the iPad for teaching and learning.

# Summary of Fall 2014 Tablet Assessment Reports

Thirty-five reports were submitted. Faculty members were able to implement thirty instances of direct micro-assessment, with some faculty reporting on more than one instance of assignment level assessment. There were nine cases of indirect assessment all of which used student surveys to gather student reactions, opinions, and information about their use of the tablet. In six cases, no significant assessment occurred typically due to some assessment design flaw or technical problem. As shown below, various assessment outcomes were recorded (see figure 1). 42% of the reports indicate that the tablet had a positive impact on student learning.

**Figure 1.**

**How the tablets were used**

Students were asked to use the tablet in those classes designated as tablet classes. Student use of the tablet clustered into six areas: creating and using multimedia, teaching student-to-student, drawing or visualizing processes, quizzing, completing assignments, and engaging in fieldwork. Most often, tablets were used by students to create or use multimedia. 47% of tablet use fell into this category. This is both a function of specialized activity by disciplines involved in the tablet project but also may indicate the particular strength in functionality of the tablet. (Figure 2)

**Figure 2.**

If one considers how the tablets were used by department, we can see how student use of the tablet clustered in some disciplines. (Figure 3) The Journalism, Physical Therapy, Kinesiology, and Health Science departments found effective ways to have the students create and use multimedia. Quizzing as a form of quick feedback for students and professors was seen in Biology and Psychology, especially for large classes. Use of the tablet for students teaching other students showed up in Special Education, Liberal Studies, and Biology. Since tablet use is still in a preliminary phase, these clusters are probably due to nothing more than the current state faculty imagination in their use of the tablet and there is every reason to think that how the tablet is used will change in the future as faculty members become more familiar with using the tablets in their classes and students become more familiar with the available apps.

**Figure 3.**

There was no general correlation between how students used the tablet and whether or not a faculty member was able to design and implement effective direct assessment. The chart below details how the iPad was used and the outcome of the assessment (Figure 4). Additional comments on indicators of effective direct assessment will occur below in “Section IV. Trends within Direct Assessment Results”.

**Figure 4.**

**Micro-assessment Assignments**

The goal of the assessment phase of the project is to gather evidence about whether using the tablet makes a difference for student achievement of learning outcomes. From the previous two semesters we learned that achieving course learning outcomes was influenced by a variety of factors over the period of a semester. The variety of learning opportunities, the impact of the professor, the variety of quizzes, exams, and assignments taken cumulatively throughout a semester result in a reduced ability to assess the impact of the tablet alone.

We needed a way to focus on the use of the tablet. As a result, faculty members in the fall 2014 tablet assessment project were asked to conduct ‘micro-assessments’; that is, assessments conducted through engagement in a single particular activity within the class. For most faculty members, this was implemented as an individual assignment or project, though quizzes and exams together were used with greater frequency (Figure 5).

Successful assessment typically requires separate design and implementation phases. Faculty members were asked to design assessment plans which included articulation of the specific knowledge or skills they wanted the students to achieve through the opportunities for learning which the course provided; i.e., learning outcomes. Design of the assessment plan further involved specifying what students would be asked to do in order to show the degree to which they achieved the intend outcome(s). Implementation of the assessment plan involved asking the students to engage in a task. The results of their implementation of the task provided evidence of student learning of knowledge or skills. When specific learning outcomes, learning opportunities, and student performance tasks were aligned in this way, faculty members were in a position to gather evidence as to whether tablet use made a difference for student learning.

**Figure 5.**

Again, there was no indication that any particular method of assessment by itself was correlated with whether or not the tablet had a positive impact on student learning. (Figure 6)

**Figure 6.**

Some types of assessment strategies are used more often in some disciplines than others (Figure 7). **Figure 7.**

# Learning Outcomes and their Assessment

The micro-assessment project required at least one assignment learning outcome. But in addition, faculty could identify the course and/or program learning outcomes with which the task learning outcomes are aligned. For cases where there was alignment, the task assessment results could provide evidence of student learning for course and sometimes program learning outcomes. The table below summarizes at least one of the outcomes selected, which vary from program to course to assignment levels.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Dept.** | **Outcome**  (At the Program, Course or Assignment level) | **Result** | | | | |
|  |  | **Neg.** | **No success** | **NSD** | **Pos.** | **Total** |
| **BIOL** | **Program:** Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment. | 2 |  | 4 | 2 | **8** |
| **Program:** Demonstrate specialized knowledge in one or more disciplines of biology. |  |  | 1 | 1 | **2** |
| **HSCI** | **Program:** Apply knowledge and skills necessary of program planning, implementation and evaluation of health education programs in a variety of practice settings. |  | 1 |  |  | **1** |
| **Program:** Demonstrate knowledge of public health and health education program planning; theories of health behavior; change assessment and intervention and multicultural influences impacting the delivery of public health interventions. |  |  | 1 | 1 | **2** |
| **JOUR** | **Assignment:** Students will learn basic HTML elements so that they can create simple web documents on their own and read documents created by others. |  | 1 |  |  | **1** |
| **Program:** Apply tools and technologies appropriate for the news media professions in which they work to communicate for and with diverse publics. | 2 | 1 |  | 2 | **5** |
| **Program:** Gather and analyze information, including basic numerical concepts, using reporting techniques, such as interviewing, observation, and researching primary and secondary sources. |  | 1 |  |  | **1** |
| **Program:** Report and write for diverse publics, using proper grammar and punctuation, word usage and spelling, sentence and storytelling structures across multiple journalistic formats. |  | 1 |  |  | **1** |
| **Program:** Think critically, creatively and independently. |  |  |  | 1 | **1** |
| **KIN** | **Course:** This tablet course is KIN 349 General Medical Conditions. It is an online hybrid course where students are learning the material in a self-directed manner, assessed in an online environment and given an opportunity to apply what they've learned in limited lab sessions. The course-level outcome I will assess is that students will be able to differentiate between normal and abnormal heart, breath, and bowel sounds and the associated pathophysiology. |  |  |  | 1 | **1** |
| **Program:** Demonstrate proficiency of athletic training skills |  |  |  | 1 | **1** |
| **Program:** Practice professional conduct at all times |  |  |  | 1 | **1** |
| **LR S** | **Program:** Think critically and creatively. |  |  | 1 |  | **1** |
| **PSY** | **Program:** Demonstrate familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology. |  |  |  | 1 | **1** |
| **Program:** Understand and apply basic research methods in psychology, including research design, data analysis, and interpretation. | 1 |  |  |  | **1** |
| **PT** | **Assignment:** Students will be able to analyze functional activities common in everyday life and determine the minimum strength required in key muscle groups to perform each activity in a normal manner. Students will then assign appropriate minimum muscle grades on a 0-5/5 Manual Muscle Testing (MMT) standard scale to the key muscle groups and document these results. | 1 |  |  |  | **1** |
| **Course:** Demonstrate safe and effective Grade I-V mobilization techniques for cervical, thoracic, lumbar, TMJ and pelvic dysfunctions based on the examination findings, interpret the response to mobilization and modify the treatment appropriately. |  |  |  | 1 | **1** |
| **Program:** Demonstrate comprehension of the foundational sciences of anatomy, physiology, neurology and pathology for application to the physical therapy clinical setting |  |  | 1 |  | **1** |
| **Program:** Practice as a reflective and competent clinician whose clinical decision making skills are guided by ethical practice standards | 1 |  |  |  | **1** |
| **SPED** | **Assignment:** Students will develop their skills of using the iPad to take note, record and document. Students will use their iPad to document and record their visit with a family of a child with a disability. |  | 1 |  |  | **1** |
| **Program:** Planning instruction and designing learning experiences for all students. |  |  | 1 | 4 | **5** |

# Trends within Direct Assessment Results

The following charts are summaries. They divide the assessment results into cases where faculty found that the tablet had a positive impact on student learning, the tablet had a negative impact on student learning, the tablet made no significant difference to student learning, and no successful tablet assessment occurred. Please follow each link to find the complete faculty report.

**The Tablet had a Positive Impact**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course  (Follow hyperlink for full report) | Professor | Approach: How was iPad | Type of Assessment | Outcome: positive, negative, NSD, no successful assessment | Learning Outcome |
| [BIOL 106](https://mycsun.box.com/s/1rx37qzdx000skanuuetfk3krnss5h08) | Robertson | Drawing: in class practice and participation | Graded quiz | Positive: grades improved and fails decreased | Program: Demonstrate specialized knowledge in one or more disciplines of Biology. |
| Summary: The average percentage scores on exams given two weeks after iPad learning increased 15%, indicating that retention of the material is high. The number of failing students decreased. | | | | | |
| [BIOL 107](https://mycsun.box.com/s/wwen9xado1sqngbjchijocn5emnwteik) | Stein | Use multimedia: tutorials to enhance learning | Graded quiz | Positive: scores improved | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment. |
| Summary: Group A (with) had an average score of 3.89 out of 5 (n=47) while group B (without) had an average score of 3.33 (n=41). These results suggest that providing additional tutorials and practice problems using the easy technology associated with the iPad for delivering these types of learning tools would be helpful for students. | | | | | |
| [BIOL 360](https://mycsun.box.com/s/kyv2b7f5wq4ggzytey519jck4olnfywi) | Malone | In class quizzes, exams and assignments | Graded problem solving | Positive: grade improvement | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment |
| Summary: Quizzes show that students improved their problem solving after both iPad teaching and practice using the iPad. | | | | | |
| [HSCI 237](https://mycsun.box.com/s/zcijyk1k6cbkgq1ut84t4w6mtzd1eohm) | Valdez | Create multimedia: use tablets to take photos and videos | Exam | Positive: scores improved | Program: Demonstrate knowledge of public health and health education program planning; theories of health behavior; change assessment and intervention and multicultural influences impacting the delivery of public health interventions. |
| Summary: Exam 1 Mean Score: iPad section: 79.8; Non-iPad section: 73.9  Determinants of Health questions (15 points possible), mean score: iPad section: 9.1; Non-iPad section: 5.3 | | | | | |
| [JOUR 210](https://mycsun.box.com/s/h3yn1ksok6koxamfjgx6th93h2hb9s88) | Whyte | Create multimedia products | Final assignment/project | Positive | Program: Apply tools and technologies appropriate for the news media professions in which they work to communicate for and with diverse publics. |
| Summary: The students in the iPad class (63%) displayed a much higher propensity to tackle multimedia storytelling then in the non-iPad class (20%). The grades on the multimedia component averaged 86% in the iPad class vs. 78% in the non-iPad class. | | | | | |
| [JOUR 250](https://mycsun.box.com/s/rw7egy63e3aas96qlfbq7k0lymdsf3tb) | Thuente | Drawing: create political cartoons | Assignments | Positive | Program: Think critically, creatively and independently. |
| Summary: The percentage of students who finished the assignment was 76% in fall 2013; in the fall 2014 iPad class, 93% finished. And the quality of the cartoons improved. | | | | | |
| [JOUR 397](https://mycsun.box.com/s/rf0lx6qe6eggebjtd1eillc0s8mis6bm) | Macchiarella | Create multimedia | Mutlimedia grades with rubric | Positive for audience engagement | Program: Apply tools and technologies appropriate for the news media professions in which they work to communicate for and with diverse publics. |
| Summary: There was significant improvement in the number of students who considered digital elements in their story proposal assignments. | | | | | |
| [KIN 333](https://mycsun.box.com/s/7qqh2kf1a4xh3kwrtbrilsdsl87q2hpn) | Montgomery | Create and use multimedia | Graded assignment | Positive: grade improvement | Program: Demonstrate proficiency of athletic training skills |
| Summary: Students demonstrated an ability to record and use apps on the iPad to make more objective, quantifiable observations of a movement pattern performed at full-speed when compared with using the eye alone. | | | | | |
| [KIN 349](https://mycsun.box.com/s/3s844mzgnsblgo9yzhh5jh03brv60c78) | West-Sell | Use multimedia | Quiz | Positive: scores improved | Course: This tablet course is KIN 349 General Medical Conditions. It is an online hybrid course where students are learning the material in a self-directed manner, assessed in an online environment and given an opportunity to apply what they've learned in limited lab sessions.  The course-level outcome I will assess is that students will be able to differentiate between normal and abnormal heart, breath, and bowel sounds and the associated pathophysiology. |
| Summary: This indicates that students were better at differentiating the normal and adventitious heart and breathing sounds after using the iPad app iStethoscope. | | | | | |
| [KIN 437](https://mycsun.box.com/s/xtt3sjrwe5tsc8o4n2udrdvyej2lauf3) | Jarvis | Assignment: use tablet to document a rehab session | Assignment | Positive: improved quality of student work | Program: Practice professional conduct at all times |
| Summary: Documentation of a rehabilitation session both for a traditional SOAP note and for a mock submission to an insurance company was much more effective using the iPad, allowing the students to demonstrate documentation skills and using an electronic insurance claim form. | | | | | |
| [PSY 369](https://mycsun.box.com/s/tvqe71k4xb6sx29lroptj688hdu42u90) | Drew | In class quizzing: daily knowledge checks | Course grades | Positive: decrease in number of Ds | Program: Demonstrate familiarity with the major concepts, theoretical perspectives, empirical findings, and historical trends in psychology. |
| Summary: There was a noticeable decrease in the percentage of the students receiving “D”s in the course. | | | | | |
| [PT 730L](https://mycsun.box.com/s/k3113rd498oktl8lc4euieeszbpuvb8z) | Kachingwe | Use multimedia: eLabs | Midterm exam grades | Positive: grade improvement | Course Objective #7: Demonstrate safe and effective Grade I-V mobilization techniques for cervical, thoracic, lumbar, TMJ and pelvic dysfunctions based on the examination findings, interpret the response to mobilization and modify the treatment appropriately. |
| Summary: In years prior, students have typically scored (on average) 3-5 points LOWER on their midterm practical compared to their final practical. Last semester, on average, the students scored 4 points higher on the midterm practical examination, when they had an electronic (eLab) of the lab content. | | | | | |
| [SPED 406](https://mycsun.box.com/s/fqmykge4kjn74nlrh6kahffjd6qx58gz) | Goodwin | Teach other students: develop lesson plans that integrate tablet | Lesson plans assessed using a rubric | Positive | Program: Planning instruction and designing learning experiences for all students. |
| Summary: Scores on lesson plan design improved or stayed the same in all three areas measured for iPad lessons over traditional methods. | | | | | |
| [SPED 502](https://mycsun.box.com/s/y2q1asiemtfurnnt76bd9giv29s28xj5) | Goodwin | Teach other students: use tablet to evaluate tutoring session | Assignment assessed using a rubric | Positive | Program: Planning instruction and designing learning experiences for all students. |
| Summary: Teacher candidates’ meaningful use of technology increased from 11 % (spring 2014) to 40% (fall 2014), meaning that the use of the iPad added value to the lesson that could not easily be achieved through another medium. | | | | | |
| [SPED 502](https://mycsun.box.com/s/3nuwlh1gqchqs389qmzfou6yrznbzpgz) | Spencer | Teach other students: use tablets to develop assignments and teach students | Indirect assessment across semesters | Positive: tablet use increased and increased in more meaningful ways | Program: Planning instruction and designing learning experiences for all students. |
| Summary: Spring 2014: 27% of the students used technology in a meaningful way; fall 2014: 59% of the students used technology in a meaningful way. | | | | | |
| [SPED 503](https://mycsun.box.com/s/q8d136uvm87fp57jibul9fmohb5uq38g) | Spencer | Teach other students: develop assignments and teach students | Rubric used to assess student assignments | Positive: tablet use increased and increased in more meaningful ways | Program: Planning instruction and designing learning experiences for all students. |
| Summary: For three areas measured: fall 2014: 75% of the students produced assignments received a rating of "strong evidence" compared with spring 2014: 42% of the students produced assignments received a rating of "strong evidence". | | | | | |

Analysis: In the cases where the assessment results indicated that the tablet was used to make a positive impact on student learning, a number of reasons were given in the faculty reports, including:

* Students working with the iPads seem to have a greater affinity for incorporating technology and multimedia tools in their reporting and an increased propensity toward multimedia reporting
* Working with drawing apps is fun
* Students appeared to deliberately select iPad apps that forwarded their instructional goals. The technology was a part of teaching rather than just a convenience
* Digital access is key in the instructor’s learning environment
* Students were able to make more observations of movement through playback of videos
* Student ability to master course material was aided through eLabs and the most important aspect of the eLabs, from the students’ perspectives, was the videos
* iPad app iStethoscope is a valuable resource and more useful than text and web-based resources alone

What can we make of these reasons? They indicate that tablet use must be meaningful both within the scope of the course and for the requirements of the discipline. They indicate the importance of practice and practicing with feedback. And tablet use which motivates students and doesn’t hinder their learning means they put more time on task. This is a result every educator would applaud.

**The Tablet had a Negative Impact**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course | Professor | Approach: How was iPad | Type of Assessment | Outcome: positive, negative, NSD, no successful assessment | Learning Outcome |
| [BIOL 106](https://mycsun.box.com/s/lvmodghucaeadnwv874poeq4zld354ix) | Karels | Teach other students: present/teach other students and solve problems | Problem set grades | Negative | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment. |
| Summary: Students in fall 14 with iPads were 10% lower in their problem set grades compared with non-iPad sections in summer 13 and summer 14. | | | | | |
| [BIOL 107](https://mycsun.box.com/s/wwen9xado1sqngbjchijocn5emnwteik) | Stein | Use multimedia: tutorials to enhance learning | Grades quiz | Negative: scores decreased | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment. |
| Summary: Daily quizzing using the tablet did not produce the degree of retention which would lead to higher exam grades. | | | | | |
| [JOUR 397](https://mycsun.box.com/s/rf0lx6qe6eggebjtd1eillc0s8mis6bm) | Macchiarella | Create multimedia | Mutlimedia grades with rubric | Negative for audience engagement | Program: Apply tools and technologies appropriate for the news media professions in which they work to communicate for and with diverse publics. |
| Summary: There was significant decrease in the number of students who considered audience engagement in their story proposal assignments. | | | | | |
| [JOUR 498](https://mycsun.box.com/s/47amsrcbl1y13x9uq4u9crl4sdr4coy1) | Bendavides | Create multimedia | Final exam and presentation | Negative: 50% preferred to use professional cameras | Program: Apply tools and technologies appropriate for the news media professions in which they work to communicate for and with diverse publics. |
| Summary: Only 50% of the students were able to produce feature stories using tablets as a reporting tool and provide either an audio, video, or an interactive map. The other 50% already had a well-grounded knowledge of photojournalism or video production and preferred to use their professional cameras to create multimedia presentations using sound/photo presentations and video. | | | | | |
| [PSY 320](https://mycsun.box.com/s/v25yqhgpaam3a1sb08zlvfphtpoweteb) | Kramarova | In class quizzes (daily) | Exam | Negative | Program: Understand and apply basic research methods in psychology, including research design, data analysis, and interpretation. |
| Summary: The daily ‘iActivity’ proved to be a distraction due to slow internet connections, freezing pages, etc., and did not lead to higher grades on exams when compared with previous semesters. | | | | | |
| [PT 732](https://mycsun.box.com/s/1u81wylw28xhjqh2583yz048y49qmtof) | Roller | Create multimedia: film and analyze movement | Grades assignment | Negative: decrease in grades | Assignment: Functional Strength Testing Lab Outcome: Students will be able to analyze functional activities common in everyday life and determine the minimum strength required in key muscle groups to perform each activity in a normal manner. Students will then assign appropriate minimum muscle grades on a 0-5/5 Manual Muscle Testing (MMT) standard scale to the key muscle groups and document these results. |
| Summary: Student performance on the functional strength portion of Lab Exam #1 was worse this year than any of the 3 prior years. | | | | | |
| [PT 775](https://mycsun.box.com/s/gvaa5oloue6nv5mone2cyxlck01uoju8) | Graham | Use multimedia: eBook experiment | No assessment | Negative/no successful assessment | Program: Practice as a reflective and competent clinician whose clinical decision making skills are guided by ethical practice standards |
| Summary: Quiz results indicated that students could not identify common gait deviations despite the availability of an iBook to which they could refer outside of class time. | | | | | |

Analysis: In the cases where the assessment results indicated that the tablet failed to make a positive impact on student learning, a number of reasons were given in the faculty reports, including:

* Failure of adequate network connectivity in the classroom
* The tablet served as a distraction from engaging with the current live activity of the lab
* The tablet served as a distraction from the student-professor interaction
* Tablet functionality did not compare favorably with other technologies
* Students and/or faculty lacked sufficient familiarity with the tablet or the app used

What can we make of these reasons? Tablets can serve to enhance learning, but the context must be right. Technical conditions for its use and readiness on the part of faculty and students must be in place.

**The Tablet made No Significant Difference (NSD)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course | Professor | Approach: How was iPad | Type of Assessment | Outcome: positive, negative, NSD, no successful assessment | Learning Outcome |
| [BIOL 107](https://mycsun.box.com/s/xub8oo1e9gbhfxifbvljb68ooolmnczo) | Kwok | Drawing: biological processes | Quiz | NSD | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment. |
| Summary: Drawing mitosis on the iPad did not lead to mitosis quiz scores higher than for the traditionally taught meiosis segment and quiz. | | | | | |
| [BIOL 107](https://mycsun.box.com/s/wwen9xado1sqngbjchijocn5emnwteik) | Stein | In class quizzes (daily) | Final exam | NSD | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment. |
| Summary: A correlation coefficient of 0.504 demonstrates that there is no correlation between the score that students received on their homework assignment (with tablet) and the information that was retained and produced on the final exam (without tablet). | | | | | |
| [BIOL 360](https://mycsun.box.com/s/014o22l8g1mczoi9waorjon63me77be7) | Van Buskirk | Drawing: in class assignments | Exam | NSD | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment |
| Summary: Without the use of the iPad (Fall 2011), the average score on 13 quiz questions was 75%. With iPad instruction, the average score over the 13 questions was 70%. | | | | | |
| [BIOL 380](https://mycsun.box.com/s/fwvyb0f3qoqa2jiaas6l4ny9pk3ul6fw) | Kay-Nishiyama | Use multimedia: online tutorial | Quiz | NSD | Program: Demonstrate specialized knowledge in one or more disciplines of Biology. |
| Summary: There was no significant difference between students given access to eTutorial and those without access to tutorial until after the quiz. | | | | | |
| [BIOL 380](https://mycsun.box.com/s/qtjcvkw0t5e3ot8ptoax1iunf3owpw2d) | Stein | Drawing: Biological processes | Final exam | NSD | Program: Demonstrate knowledge of the structure and metabolism of cells, the transmission and expression of genetic information, and the immediate and evolutionary consequences of interactions between organisms and their environment. |
| Summary: Using tablets to draw biological processes did not make a significant difference in student exam scores. | | | | | |
| [HSCI 439](https://mycsun.box.com/s/6lmqa3jgv6p7ajxrdi3y39tdxoamegbx) | Young | Use multimedia | Quiz | NSD | Program: Demonstrate knowledge of public health and health education program planning; theories of health behavior; change assessment and intervention and multicultural influences impacting the delivery of public health interventions. |
| Summary: The iPad group with eText and eResources and the non-iPad groups received exactly the same quiz scores. | | | | | |
| [LR S 100](https://mycsun.box.com/s/i0p5hzgucyh4ipy6e41g7kiw966gpslj) | Huynh | Teach other students: present/teach other students | Midterm exam grades | NSD | Program: Think critically and creatively. |
| Summary: The scores on two assignments, one with the iPad and one without, were not significantly different. | | | | | |
| [PT 700](https://mycsun.box.com/s/8xi4amuaku32hignmf7lbfh681236ne6) | Phillips | Use multimedia | Exam | NSD | Program: Demonstrate comprehension of the foundational sciences of anatomy, physiology, neurology and pathology for application to the physical therapy clinical setting |
| Summary: iBook dissection guide did not make a difference to student achievement but the labs ran more efficiently. | | | | | |
| [SPED 406](https://mycsun.box.com/s/cvvkjn9khwynpzp7s7f3gy48i5wpyz0g) | Narr | Teach other students: develop lesson planst that integrate tablet | Assignment | NSD | Program: Planning instruction and designing learning experiences for all students. |
| Summary: Only 50% of the students could effectively use the iPad in lesson plan design. | | | | | |

Analysis: In the cases where the assessment results indicated that there was no significant difference in student learning with the tablet, a number of reasons were given in the faculty reports, including:

* Drawing is not enough; it may be beneficial to have students provide images and written responses side-by-side in order to reinforce complex pictures with the information about each process
* Need to revise the assessment instruments
* Motivated students will do well with or without technology
* Text savings, efficiency of lab time and student study time are valuable even if grades do not improve
* Need to revise pedagogy and curriculum

**Tablet Assessment did not Occur**

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| Course | Professor | Approach: How was iPad | Type of Assessment | Outcome: positive, negative, NSD, no successful assessment | Learning Outcome |
| [HSCI 445](https://mycsun.box.com/s/n2m6c5ujmkv2jsqipmlpvsj56tg2hdsr) | Valdez | Fieldwork and documentation | Final paper | No successful assessment | Program: Apply knowledge and skills necessary of program planning, implementation and evaluation of health education programs in a variety of practice settings. |
| [JOUR 110](https://mycsun.box.com/s/hwg1ac5ed7hcg5q5bok10nc60w655s0y) | Bluestein | Drawing: in class sentence diagramming | No assessment | No successful assessment | Program: Report and write for diverse publics, using proper grammar and punctuation, word usage and spelling, sentence and storytelling structures across multiple journalistic formats. |
| [JOUR 315](https://mycsun.box.com/s/5stzkob3dlnnwlmaz6vdskgxeepnbmgb) | Rojo | Create multimedia | Project | No successful assessment: failed due to low audio quality | Program: Gather and analyze information, including basic numerical concepts, using reporting techniques, such as interviewing, observation, and researching primary and secondary sources. |
| [JOUR 331](https://mycsun.box.com/s/dv1nqa24ikmqdg2n27ozaey6etrmzny5) | Shapiro | Create multimedia: design | Indirect assessment | No successful assessment: tablet underperforms PC | Assignment: Students will learn basic HTML elements so that they can create simple web documents on their own and read documents created by others. |
| [JOUR 495](https://mycsun.box.com/s/agy8vq7yjeh3o0e5j0sacz3ucfykzf1x) | Turner | Create multimedia: design and display graphics in multimedia | No direct assessment though a rubric was developed | No successful assessment | Program: Apply tools and technologies appropriate for the news media professions in which they work to communicate for and with diverse publics. |
| [SPED 403 MM](https://mycsun.box.com/s/3nbx7jzpekgvt5judjiitpj2hcqlnze3) | Lasky | Fieldwork: document a home visit | Written papers | No successful assessment | Assignment: Students will develop their skills of using the iPad to take note, record and document. Students will use their iPad to document and record their visit with a family of a child with a disability. |

Analysis: There were a variety of reasons why tablet assessment did not occur. They include:

* More time was needed for planning and student coaching – Valdez, Bluestein, Lasky
* Technology inadequate to task – Shapiro, Rojo
* Students use their iPads for communicating with sources and other journalists about as often as they use a desktop or a laptop; their tool of choice for communication is a smart phone
* Students do not choose the iPad for writing-intensive assignments because the keyboard is inconvenient; a desktop or laptop is the tool of choice
* Students prefer the iPad for posting text and photos to social media, although they also can use a smartphone for the same purpose
* Students use the iPad for graphic design and display because it is easy to connect to a larger monitor
* Students do not use the iPad to shoot or edit video, preferring the department’s equipment, or their own equipment

# Emerging Themes and Lessons Learned by Faculty Participants

Tablet assessment projects began with the first small cohort of tablet sections during fall 2013 and grew each semester as the number of tablet sections and participants increased. We did not know what we would find out about the impact of the tablet on student learning through assessment and saw this as an important means for gathering evidence. As seen above, the tablet can have a positive impact on student learning. But whether it does so depends on a number of additional factors. In this section we will highlight some of the additional factors which impact the effective use of the tablet for student learning as well as some emerging themes and lessons highlighted in faculty reports. For anyone or any program considering the investment of time and money, these are well worth considering.

1. **Training and Technical Assistance**

Faculty experience with the tablet in general and with using the tablet to teach curriculum in particular makes a crucial difference for its effective use. Without adequate familiarity, obstacles arise, including sabotage of the intended pedagogy and frustrated students. During the first semester of the tablet initiative, faculty development soon became recognized as the single most glaring need. Faculty participants were inadequately experienced with the tablet, with the available apps, and even if familiar with some apps, were unfamiliar with the functionality of the app. The tablet project leaders have been aware of the need for faculty development in order for faculty to be adequately prepared to teach with the tablet and have responded accordingly with faculty training sessions and on-demand faculty help. Even better than same semester training sessions, are training sessions during the semester prior to teaching with the tablet. In a time travel do-over, it would be recommended that faculty training and development occur during the semester or year prior to the roll-out of any tablet courses. As experience increases, their confidence in using it increases. Faculty members recognize the need to “roll out the iBook in stages, begin with in-class experiences accessed through Moodle or other platform”. “In reviewing the methodology of this iPad activity, it would have been more helpful to have started earlier in the semester so that it could have been repeated several times”.

Even when faculty are familiar with the functionality of the tablet and command the resources provided by their apps, the in-class experience can be sabotaged by technical glitches from problems with WiFi and broken cables. “Always have a low tech plan B! Simple things like no WiFi or a broken cable can shut down the entire class”. “When possible, come to class early and be sure that all tech works in the classroom.” “ALWAYS try out materials from Moodle on your own iPad. I found that some links worked fine on my laptop, but not on my iPad”. Faculty members now have on-demand technical assistance in the classroom.

Faculty development is necessary for effective assessment, too. Most faculty members are not familiar with the components of assessment and their roles in the design and implementation of assessment plans. Our faculty learning communities have been useful as vehicles for learning about assessment, learning from each other, and developing their ideas in anticipation of implementing their micro-assessments. From their assessment results, faculty may revise curriculum, revise learning opportunities, revise pedagogy, or revise their assessment strategies.

1. **The students need training, too**

Often students are way ahead of faculty in their familiarity with hardware and software functionality, but sometime not! Students need training, too. Effective use of the tablet increases when all students in a course are familiar with and use the same app. Responding to this need, some faculty intend to “provide more in-class instruction and coaching on using the app. “

“I would ensure that all students had a common drawing app, such as Explain Everything, instead of letting them choose whichever they liked. This way I could more easily troubleshoot some of their problems with the in-class drawing assignments. I would make my lecture slides even more 'skeleton-like' next time, making them fill in more of the information themselves.”

1. **Quick feedback and low-stakes quizzing**

The single most repeated benefit of using the tablet is its easy usefulness for repeated quizzing and other short, low-stakes avenues for gathering evidence of student learning, especially in large classroom environments. Low-stakes quizzing allows for student self-assessment and quick feedback on their knowledge of the material. Regular use of the tablet in the classroom whether for quizzing or other hands-on activities has the potential to increase student participation.

“Implementing daily knowledge checks via the Socrative app on the iPad held great pedagogical value; this allowed me to assess student knowledge over the progression of the semester, as well as provide students with a means of self-reflecting on their own knowledge and learning”.

“One of the major benefits the iPad provides is the ability to have frequent testing in class. This fall I gave an online quiz via Moodle in class nearly every day. This has two impacts. First is that attendance is approximately 90%, and second, the students get immediate and continuous feedback in their understanding of the material throughout the semester rather than discovering they don’t know the material after the first exam”. In some cases, some faculty members have increased the value given to daily quizzes (and made them more high-stakes); others are considering eliminating exams altogether and using daily mini-tests (quizzes) via Moodle in class. “The broader recommendation is to increase the number of opportunities for evaluation of student knowledge and application of content. I plan to include more quizzes and Moodle uploads in spring 2015.”

1. **Potential to bolster student participation**

We know that student learning increases with time on task, regardless of the medium. The tablet can be used to facilitate active learning by encouraging student participation during class, with or without points assigned to class work.

“To me, one of the important takeaways from this assessment and the Fall 2014 semester teaching with iPads is that iPad students are ‘forced’ to do something in class whether it is a quiz, a poll question, group work, a Moodle submission, etc. In traditional classes, students have more opportunity to sit and be a passive learner; they may not take notes, they may never raise their hand to contribute to discussion, they may never ask a question. The iPad allows for participation, engagement, and mini assessments throughout the semester.”

1. **Impact on the learning environment**

The tablet has an impact on the learning environment within the classroom. Integration of the tablet into a course requires that faculty reflect in new ways on their curriculum and pedagogy. Redesign of the course needs to occur before the ‘active’ semester so that faculty and students are not learning on the fly.

In some cases, as the quality of teaching goes up, faculty members are asking more of their students. This is all good, except when students are asked to perform at a higher cognitive level on exams and projects, but changes in learning opportunities and curriculum have not been adequately adjusted. The moral: in order for applications of knowledge to rise, everything else must rise, too.

The tablet has the potential to make large classes more intimate as student participation increases and students feel more involved in the classroom as a community. “Using the tablet improved content delivery by the instructor (improved teaching) by creating an engaging and more personal environment in a large classroom (134 students)”.

1. **Rescuing students on the edge of failing**

In a number of instances over the three semesters, the tablet made a difference for quiz and exam scores at the lower end of the distribution, even if the tablet made no difference for student grades overall. “These data suggest that there is not a significant impact on the grades received between the iPad and non-iPad learning environments. However, it should be noted that there was a noticeable decrease in the percentage of the students receiving ‘Ds’ in the course”. Faculty members have remarked that motivated students will find a way to succeed, with or without new technologies. But if tablets can help the unmotivated students, then it is a valuable tool.

And the tablet can be used to identify and provide extra resources to students who need them. “The fact that students with the lowest quiz average scores almost always fail the course provides an invaluable tool to reach out to students in trouble early during the course”.

“Having early and frequent quizzes that predict course grades may help in getting these students on track sooner. I will provide this data to students to help them help themselves in my future classes”.

1. **Choosing the best tool**

Students increasingly are aware of the iPad as one tool available to them. Even when comfortable using it, they may choose other technology based on convenience, connectivity, and (lack of) availability of apps. The functionality of the iPad may be inadequate. We see that disciplines may have particular technological requirements which go beyond the scope of what the tablet can offer, such as the need to create high quality video.

Faculty members also have remarked that for some purposes the iPad offers too much functionality and is not cost effective for the task. In some cases, a smart phone is sufficient. In other contexts, such as field work and home visits, tablet use may be intimidating for the members of the community.

A few caveats in conclusion: The information contained in the faculty reports has been rich and informative, but recognizably limited. Even though the number of faculty participants has grown over the three semesters of the initiative, the number remains fairly low. Faculty and student mastery of apps remains an issue. Faculty design and implementation of strategies to assess the impact of the tablet on student learning remains a work in progress.

With these limitations in mind, we can nonetheless safely say that when the tablet is used in ways which are appropriate for the discipline, by well-trained faculty and students, it can provide a valuable resource and vehicle for facilitating learning and discipline specific activities. We are all getting better at this. It will be interesting to see whether tablet use becomes increasingly effective.