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Direct Assessment of Student Achievement through D2L

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Direct Assessment of Student Achievement through D2L

Abstract

This paper delves into the implementation of D2L/Brightspace learning outcome tools specifically designed for the direct assessment of course outcomes, with a keen focus on ABET Student Outcomes (SOs) based on our experience preparing for the ABET accreditation visit. ABET accreditation is a mark of excellence in applied science, computing, engineering, and technology programs. This accreditation guarantees that graduates are equipped with the essential skills necessary for their respective professions, thereby enhancing their employability and readiness for the workforce.

ABET SOs are carefully constructed, measurable statements that define the knowledge and skills students should acquire upon graduation. These outcomes encompass a variety of critical competencies, including technical proficiency, effective communication, and problem-solving abilities. Direct assessment involves evaluating student performance through various measures, such as exams, projects, and presentations. This approach ensures clear alignment with ABET SOs, providing concrete evidence of student learning and competency.

However, the traditional method of documenting these assessments can be labor-intensive and susceptible to inaccuracies. To mitigate these challenges, this paper advocates for the utilization of digital tools like D2L/Brightspace, which can significantly streamline the assessment process. By employing such tools, educators can efficiently track student work, automate data collection, and ensure assessments are consistently aligned with ABET SOs.

Additionally, the paper identifies key areas for improvement within D2L, such as the option to configure assessments as "not counted", the ability to easily download assessment results, and enhanced segregation of students for reporting purposes. Overall, D2L emerges as a powerful asset in refining the direct assessment of ABET SOs, ultimately ensuring that educational programs not only meet established goals but also effectively prepare students for successful careers in their chosen fields.

Introduction

ABET accreditation [1] is a mark of distinction and quality assurance for programs in applied science, computing, engineering, and engineering technology. It signifies that a program meets the rigorous standards set by ABET, ensuring that graduates are prepared to enter their professions with the skills and knowledge needed to succeed. ABET accreditation is globally recognized as a symbol of quality in technical education.

ABET SOs are specific, measurable statements that describe what students are expected to know and be able to do by the time they graduate from an ABET-accredited program. These outcomes cover a broad range of skills, including technical competence, communication, teamwork, and ethical responsibility. ABET SOs are designed to ensure that graduates are well-prepared to enter the workforce or pursue further education in their field, and they serve as a benchmark for evaluating the effectiveness of educational programs. In [2–5],different direct assessment instruments are discussed for ABET accreditation purposes.

Direct assessment of ABET Student Outcomes (SOs) evaluates student performance using structured measures such as exams, projects, and portfolios. These assessments provide concrete evidence of students' knowledge and skills as defined by the ABET SOs. In contrast, indirect assessment gathers insights into student learning through tools such as surveys, interviews, and self-assessments. While indirect assessment does not directly measure student performance, it offers valuable perspectives on the overall effectiveness of educational programs and helps identify areas for continuous improvement. Together, direct and indirect assessments ensure that ABET-accredited programs fulfill their educational objectives and equip students with the necessary competencies for their professional careers.

Documenting the direct assessment results of students' ABET SOs poses a persistent challenge in academia. At our university and many others, instructors currently track students' work manually, including lab reports, homework assignments, exam reports, senior design reports, presentations, and more. This manual tracking process is time-consuming and prone to errors, leading to inefficiencies in assessment and feedback delivery. Additionally, the sheer volume of student work generated each term can overwhelm instructors, making it difficult to provide timely and meaningful feedback to students. This challenge highlights the need for more efficient and automated methods of documenting and assessing student performance.

Numerous studies have been conducted to improve this process. For example, web-based tools were developed in [6, 7] to reduce the workload associated with program direct assessment. Additionally, an online database was introduced in [8] to integrate ABET direct assessment data. Microsoft spreadsheets have also been reported as beneficial for direct assessment purposes, as noted in [9, 10]. However, all these tools still demand significant manual effort to input essential data, including course details, program outcomes, rubrics, student information, and student achievements.

In summary, the challenges of manually assessing student outcomes (SOs) include:

- **Time-Intensive Process**: Manually tracking and recording various types of student work, such as lab reports, assignments, and exams, requires significant time and effort, especially in courses with large enrollments.

- **Prone to Errors**: Manual data entry can lead to errors, including data misplacement, inaccuracies, or incomplete records, affecting the reliability of assessment results.

- **Inconsistent Documentation**: Without a standardized system, there can be inconsistencies in how instructors document and evaluate students' achievements, leading to variations in assessment quality.

- **Delayed Feedback**: The time taken to assess and document results often delays feedback to

students, which can impact their ability to learn from and address areas of improvement in a timely manner.

- **Overwhelming Volume of Work**: The sheer quantity of student submissions each term can overwhelm instructors, making it difficult to manage assessments efficiently and effectively.

- **Limited Data for Analysis**: Manual methods often limit the depth and breadth of data that can be easily analyzed for insights, reducing opportunities for targeted improvements in instruction and curriculum.

- **Difficulty in Meeting Accreditation Standards**: Accreditation bodies like ABET require specific documentation of student achievements. Manual processes can make it challenging to provide the detailed, consistent records required for accreditation audits.

These challenges highlight the need for automated solutions to streamline assessment and improve the quality and consistency of student evaluations. One potential solution is the integration of digital tools such as learning management systems (LMS) to streamline the assessment process. By leveraging these technologies, instructors can more easily track and assess student work, ensuring that assessment data is accurately recorded and readily accessible. Furthermore, digital tools can facilitate the alignment of assessment with ABET SOs, enabling instructors to more effectively measure student achievement against these outcomes. Implementing such tools can help universities overcome the challenges associated with documenting direct assessment results and enhance the overall assessment process for both instructors and students.

Direct Assessment at Our Institution

In this section, we present our experiences with the current direct assessment process and discuss the motivations behind our pilot program for streamlining this process using BrightSpace D2L[11]. Our goal is to enhance efficiency while maintaining accuracy in assessing student outcomes. By leveraging the features of BrightSpace D2L, we seek to automate and optimize data entry, reporting, and analysis, thereby reducing the manual workload associated with direct assessment.

At our institution, the direct assessment of student achievement through course evaluations follows a structured, two-step approach:

1. At the end of each semester, instructors manually input students' achievement levels for course-specific outcomes into a designated form. This form, described in detail below, serves as the primary data collection tool for assessing student performance against predefined learning objectives for course assessments.

2. Once all assessment data has been collected, an assessment report is generated. This report compiles the outcome assessment results for these courses, along with other assessment data, and presents them using tables and graphical visualizations to illustrate whether students have successfully met the program outcomes. These reports play a crucial role in evaluating the effectiveness of the curriculum and informing future instructional improvements.

As anticipated, these procedures require a substantial investment of time and effort from faculty members, particularly in terms of data entry, aggregation, and analysis. Given the increasing demands on faculty time and the need for a more streamlined assessment workflow, we have explored alternative solutions to optimize this process. BrightSpace, a widely adopted teaching and learning platform at our institution, offers integrated tools that have the potential to facilitate direct assessment more efficiently. The availability of new learning tools within BrightSpace has motivated us to pilot an approach that leverages its capabilities to automate data collection and analysis. By doing so, we aim to significantly reduce the manpower required for direct assessment while ensuring that the process remains rigorous, transparent, and data-driven.

Below, we present a sample of the direct assessment process applied to a specific course, as shown in Table 1, before the pilot program took place. This example demonstrates a structured approach for evaluating student performance in relation to predefined learning outcomes. The direct assessment method involves systematically collecting, organizing, and analyzing student achievement data to determine whether both course-specific outcomes are being met.

As expected, manually assessing courses requires significant time and effort from instructors. The reliance on manual data entry and analysis makes the process labor-intensive and prone to inconsistencies. Furthermore, the flexibility of the manual form is limited. If an alternative assessment method—such as considering only a student's highest achievement or their most recent performance—is desired, adapting the existing form can be cumbersome and inefficient. This lack of adaptability underscores the need for a more streamlined and automated assessment approach. Given the inefficiencies of manual tracking, our institution sought to explore automated solutions. The following section presents our pilot study using D2L's direct assessment features.

Sample of Direct Assessment Form for ECE 48500

ABET student outcome assessed: 1

List all the course outcomes mapped to the above student outcome:

Course outcome 1: an ability to program an embedded system with high-level programming language. (1)

Course outcome 2: an ability to analyze the structure of an RTOS system. (1).

Total number of CPE students enrolled in this course: 14

For each course outcome listed above, please include an assignment and its assessment result.

Course outcome: 1 an ability to program an embedded system with high-level programming language. (1)

Assignment selected: Lab00c – C Practice

Total points attainable for this assignment: 100

(Please include the assignment description in the appendix.)
Assessment Results: (Please include the results for CPE students

only):

Please fill in the following table with all CPE students' performance data on this assignment (add more rows if needed):

Table 1: Lab00C - Students' Grades

Student Number	Points	Percentage
1	96	96%
2	92	92%
3	92	92%
4	98	98%
5	66	66%
6	96	96%
7	98	98%
8	88	88%
9	93	93%
10	96	96%
11	93	93%
12	95	95%
13	97	97%
14[*]	0	0%

[*] One student didn't complete and submit this assignment

Number of CPE students who achieved 70% or better: 12

Total number of CPE students who returned this assignment: 13

Percentage of (Number of CPE students who achieved 70% or higher) / (Number of CPE students who returned this assignment): 12/13=92.3%

(Note: for this assignment, 12 CPE students achieved 70% or higher, 13 CPE students returned this assignment, therefore this percentage = 12/13 = 92.3%)

Threshold: 70%

Course outcome achieved (yes/no): yes

Comments (if not achieved):

BrightSpace D2L in Direct Assessment

BrightSpace Introduction

BrightSpace, also known as D2L BrightSpace, is a popular learning management system (LMS) used by educational institutions worldwide. It offers a wide range of features to support online and blended

learning, including course content management, assessment and grading tools, discussion forums, and communication tools. BrightSpace is known for its user-friendly interface and customizable features, allowing instructors to create engaging, interactive learning experiences. The platform also provides analytics and reporting features to help educators track student progress and identify areas for improvement. Overall, BrightSpace is a comprehensive LMS that offers a flexible and effective platform for delivering education in various settings.

BrightSpace Learning Tools

BrightSpace provides customizable assessment tools, including quizzes and surveys, to evaluate student understanding and collect feedback. The platform also provides tools for creating and managing assignments, allowing instructors to set deadlines, provide feedback, and track student submissions. BrightSpace's gradebook feature enables educators to easily record and calculate grades, as well as provide students with timely feedback on their performance. These tools enable instructors to efficiently assess student learning, improving the overall educational experience.

The Learning Outcomes feature in Brightspace supports instructors implementing an outcomes-based education methodology in their courses. The Learning Outcomes tool provides this ability by using the settings and options you can configure in other Brightspace Learning Environment tools, such as Rubrics, Assignments, and User Progress, to create an overarching solution. At a high level, the solution uses the following workflow:

- Define an achievement scale (see Create an achievement scale)

- Create a Program and program-level outcomes, if needed

- Populate a course with outcomes imported from a program

- Align outcomes to course activities and content

- Assess learner work against outcomes

- Track learner progress against outcomes as the course progresses

There are additional standards and achievement features you can use to more closely tie outcomes to learner achievement.

In D2L, the learning outcome workflow typically starts with instructors defining the learning outcomes for their courses. These outcomes are specific, measurable statements that describe what students are expected to know or be able to do by the end of the course. Once the outcomes are defined, instructors can create assessments, such as quizzes, assignments, and exams, aligned with these outcomes. Throughout the course, instructors can use D2L's tools to monitor student progress and performance, providing timely feedback to help students achieve the desired outcomes. At the end of the course, instructors can assess whether students have met the learning outcomes, using the data collected in D2L to evaluate the effectiveness of their teaching methods and make improvements for future courses.

D2L can be a valuable tool for conducting direct assessment of ABET SOs in several ways. Instructors can use D2L to create quizzes, exams, and assignments that are aligned with specific SOs, allowing them to directly measure student proficiency in these areas. The platform's gradebook feature enables instructors to track student performance on these assessments over time, providing a clear picture of how well students are meeting the SOs. Additionally, D2L's reporting and analytics tools can help instructors and

administrators analyze assessment data to identify trends and areas for improvement in the curriculum. Overall, D2L provides a comprehensive suite of tools that can support the direct assessment of ABET SOs, helping to ensure that programs are meeting their educational goals.

Direct Assessment Experience using BrightSpace

In this section, we will share our experiences of how D2L learning tools are used to assess specific ECE course outcomes and how the resulting reports can help track students' achievements in this pilot study.

Since fall 2023, we have been piloting the adoption of D2L Learning Outcomes tools to assess four courses: ECE 43700 – Computer Design and Prototyping, ECE 48500 – Embedded Real-Time Operating System, ECE 40500 – Senior Design I, and ECE 40601 – Senior Design II. Both ECE 43700 and ECE 48500 are senior-level courses required for Computer Engineering students.

ECE 43700 covers the following topics: an introduction to computer organization and design, including instruction set selection, arithmetic logic unit design, datapath design, control strategies, pipelining, memory hierarchy, and I/O interface design.

ECE 48500 covers the following topics: an introduction to embedded real-time operating systems, with an emphasis on embedded system software development, tasks, inter-task communications and synchronization, as well as network software.

Students in both ECE 43700 and ECE 48500 are assigned written homework assignments, online quizzes, hands-on projects, and both middle and final exams.

ECE 40500 is the first course of a two-semester sequence of senior capstone design. It provides students with experience in the process and practice of electrical/computer component/system design from concept through final design. Emphasis is placed on teamwork, project management, and oral and written communication.

General lectures on issues important to the engineering profession, such as professional and ethical responsibility, the impact of engineering solutions in a global and societal context, and other contemporary issues, are given to students.

ECE 40601 - Senior Design II is an extension of Design I and includes, but is not limited to: (1) continued research, design, and implementation; (2) oral presentation and/or demonstration of the project to faculty and other interested parties; (3) answering appropriate questions related to the project; (4) generation of a final technical report documenting the design, development, and performance of the project. In the following sections, the procedures for using D2L learning tools in these courses are described.

Define Achievement Scales

Achievement scales are set in the Learning Outcomes tool. They define a learner's performance using terms such as "Does not meet Expectations", "Approaching Expectations", "Meets Expectations", and "Exceeds Expectations". Performance scales can be defined by words, colors used in learner outcome graphs, and percentages.

After you define your achievement scale, you can adjust how it is mapped to rubric criteria, if appropriate. They are defined as follows:

- 0-59%: Does not Meet Expectations

- 60-70%: Approaches Expectations

- 71-89%: Meets Expectations

- 90-100%: Exceeds Expectations

Define Rubrics

Rubrics provide a scoring guide that instructors can use to evaluate a learner's success with assignments, discussions, and grade items. The criteria on a rubric can align with learning outcomes, and the scores can map to achievement scales. Based on the assessed scores, rubrics can generate suggestions for learning outcome achievement.

For ECE 43700 and ECE 48500, it is not necessary to define specific rubrics, as the 100-scale grade can be easily mapped to the achievement scale. Rubrics may be useful, especially when grading essay assignments, lab reports, and oral presentations for ECE 40500 and ECE 40601. For example, for the senior design written assignment of each stage, the following rubrics in Table 2 are used for grading:

Table 2: Senior Engineering Design Rubric

	Does not meet expectation	Approaches expectation	Meets expectation	Exceeds expectation
Identifying the problem	Relevance and context of problem is unmentioned. Scope and constraints are poorly defined resulting in unclear direction for investigation.	Relevance and context of the problem is included, but vaguely defined. Scope, criteria for success and constraints are included but only superficially.	Problem is specifically defined in a relevant way with context. Criteria for success are defined. Investigation considers relevant constraints	Problem is specifically defined, as are root causes. Constraints are identified, specific, and testable.
Conceptual Designs	Constructs only one concept or solution to the problem.	Describes multiple solutions although without principles to guide how they address the problem at hand.	Multiple concepts or solutions are proposed with justification based within the constraints of the problem.	Multiple concepts or solutions are proposed with not only justification from constraints, but from external research.
Evaluating and finalizing the design	Evidence for the final design success is unsupported by testing.	Evidence for design success is weakly aligned to metrics that represent criteria and constraints.	Evidence for design success is well aligned to metrics that capture the criteria and constraints being explored.	Considers multiple metrics that align to several relevant criteria and constraints.
Optimizing the final design, and building the prototype	Makes no iterative modifications to test changes in performance.	Makes changes to original model, but the changes are not iterative or are not guided by evidence from data.	Uses iterative modifications based on evidence from data.	Uses iterative modifications based on testing and justifies final design from data.
Sharing the solution	Documentation of results does not cite references and lacks crucial information.	Documentation is organized but contains very little evidence and suggestions for further work.	Documentation communicates design strengths and weaknesses and makes recommendations for further work.	Documentation communicates design strengths and weaknesses. Evaluate trade-offs between relevant constraints.

Populate Course Outcomes

From the course syllabus, which includes the course outcomes that are mapped to ABET SOs, all the course outcomes are manually populated into D2L. This is done through the "Course Standards" tool under Course Admin. This process ensures that the course outcomes, which are the desired learning objectives for the course, are accurately reflected in the D2L system. By mapping these outcomes to ABET SOs, instructors can ensure that the course is meeting the required educational standards and that students are achieving the intended learning outcomes. Figure 1 is a screenshot of ECE 43700 course outcome populating.

Align Course Outcomes to Course Activities

During this stage, for every assignment within a course, the course outcomes are populated using predefined standards that are mapped to ABET SOs (Student outcomes). It's important to note

Course Standards

90/70/60 Scale (System Default Scale - Do not change) • No Achievement Threshold

Add Standard   **Import Standards** ⌄   **More Actions** ⌄

Outcome 1: an ability to analyze and evaluate CPU performance (ABET 2)   ···

Outcome 2: an ability to understand basic computer arithmetic algorithms, such as multiplication, floating operations, etc. (ABET 1)   ···

Outcome 3: an ability to convert simple high-level programming language codes into assembly languages (ABET 2)   ···

Outcome 4: an ability to understand the principles of a single clock cycle CPU (ABET 1)   ···

Outcome 5: an ability to implement and simulate a single clock cycle CPU (ABET 6)   ···

Outcome 6: an ability to understand the principles and practices of pipelined CPU (ABET 1)   ···

Outcome 7: an ability to understand the concepts of memory hierarchy, such as cache, virtual memory. (ABET 2)   ···

Outcome 8: an ability to use modern electronic design automatic (EDA) tools (ABET 7)   ···

Add Standard

Figure 1: D2L Course Standard Setup

that in D2L, these course outcomes are referred to as "standards". This process ensures that each assignment is aligned with specific learning objectives and allows instructors to assess whether students are meeting the desired educational standards. By mapping assignments to these predefined standards, instructors can effectively evaluate student performance and provide targeted feedback to enhance learning outcomes. Figure 2 is a screenshot of ECE43700 outcome mapping for homework assignment 02.

Assess Learner Work Against Outcomes

Once the association between each assignment and course outcomes is entered into D2L, instructors can proceed to grade each student's submitted work and assign their learning outcome scales based on the predefined rubrics. For instance, if a project is graded at 80%, it would be classified as "Meets Expectations."

In the case of senior design reports, the Senior Design rubrics are utilized to facilitate grading and to assign student achievements. These rubrics offer a structured framework for evaluating the quality of the reports and ensure that grading is consistent and fair across all submissions. By using these rubrics, instructors can provide constructive feedback to students and help them understand how their work aligns with the course outcomes and expectations.

Track Learner Progress

After grading each student's work and assigning their achievements, instructors can review the direct assessment results for each course outcome to determine if the intended learning objectives

Figure 2: D2L Align Course Outcomes Homework 2

have been met. This evaluation process is facilitated by the "Mastery View" within D2L's grading tools, as illustrated in Figure 3. The Mastery View provides a comprehensive overview of student performance, allowing instructors to see how well students have mastered each course outcome. By analyzing these results, instructors can identify areas where students may be struggling and adjust their teaching strategies accordingly. Additionally, the Mastery View enables instructors to track student progress over time, providing valuable insights into the effectiveness of their instructional methods.

Please note that the collective result for each course outcome can also be viewed for reporting purposes, as shown below in Figure 4.

Mastery View Settings of Course Outcome Assessment

Within D2L, instructors can configure the assessment results of each course outcome using various options such as "All activities," "Most recently several activities," "Highest level," "Most recent level," and more. This flexibility allows instructors to tailor their assessment approach based on individual needs. For example, they can choose to assess based on all activities completed by students throughout the course, or they can focus on the most recent activities. They can also select the highest level of achievement attained by a student or just the most recent level. This customization provides instructors with the flexibility to assess course outcomes and, consequently, ABET SOs in a way that aligns best with their teaching methods and objectives.

We piloted D2L Learning Outcomes tools to streamline direct assessment in ECE courses,

Outcome 1: an ability to analyze and evaluate CPU...		Outcome 2: an ability to understand basic comput...		Outcome 3: an ability to convert simple high-level...		Outcome 4: an ability to understand the principles...		Outcome 5: an ability to implement and simulate a...	
1/1 Exceeds Ex...	👁	1/1 Exceeds Ex...	👁	7/7 Exceeds Ex...	👁	0/2 -	👁	0/2 -	👁
0/1 -	👁	0/1 -	👁	2/7 Approaches...	👁	0/2 -	👁	0/2 -	👁
1/1 Exceeds Ex...	👁	1/1 Exceeds Ex...	👁	7/7 Exceeds Ex...	👁	0/2 -	👁	0/2 -	👁
1/1 Meets Expe...	👁	0/1 -	👁	6/7 Meets Expe...	👁	0/2 -	👁	0/2 -	👁
1/1 Exceeds Ex...	👁	1/1 Exceeds Ex...	👁	7/7 Exceeds Ex...	👁	0/2 -	👁	0/2 -	👁
0/1 -	👁	1/1 Exceeds Ex...	👁	5/7 Approaches...	👁	0/2 -	👁	0/2 -	👁
1/1 Exceeds Ex...	👁	1/1 Exceeds Ex...	👁	7/7 Exceeds Ex...	👁	0/2 -	👁	0/2 -	👁

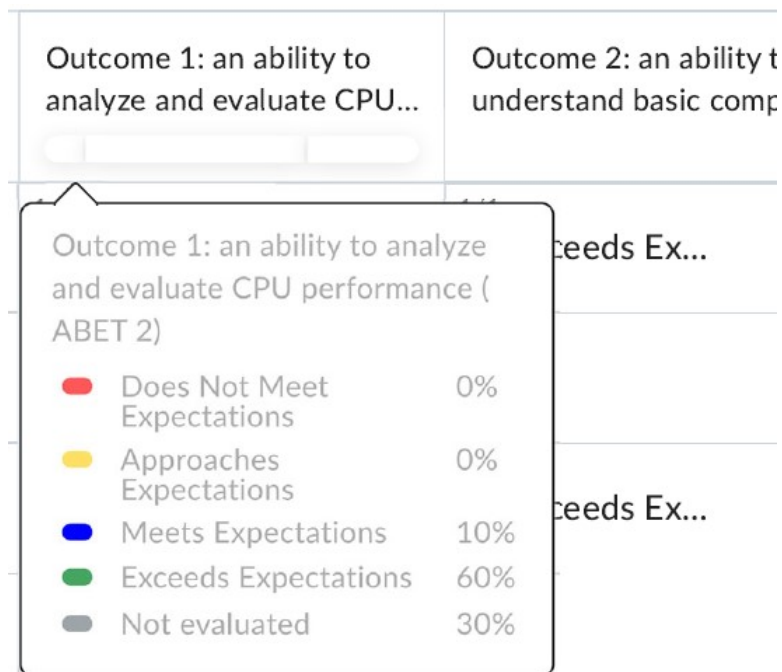Figure 3: D2L Report of Course Outcome Assessment Results

Figure 4: D2L Aggregation Results of One Course Outcome

making the process more efficient and reducing faculty workload. By aligning course activities with outcomes and using automated tracking, we improved accuracy and gained better insight into student progress. While the approach showed promise, challenges like limited data export and reporting still need to be addressed. The next section explores these findings and potential improvements.

Summary and Discussion

BrightSpace D2L Recommendations

Despite its advantages, the pilot implementation revealed several limitations in BrightSpace D2L, highlighting areas for improvement.

- The D2L tools should provide an option to mark assessments as "not counted" when students fail to submit their work. This flexibility would ensure more accurate reporting and avoid skewing assessment data.

- Currently, direct assessment results of course outcomes are only viewable within the system and cannot be downloaded. Enabling data export functionality would facilitate deeper analysis, allowing institutions to generate program-level assessment reports. This enhancement could support a comprehensive evaluation of ABET SOs based on students' performance across multiple courses.

- The current reporting capabilities across several courses are inadequate. Enhancing this feature would further streamline the direct assessment process, reduce faculty workload, and provide a clearer overview of student learning outcomes at both the course and program levels.

Addressing these limitations in BrightSpace D2L would further enhance its effectiveness as a direct assessment tool, making it a more robust solution for supporting ABET accreditation processes while minimizing administrative overhead.

Future work and discussions

This paper explores the pilot implementation of D2L learning outcome tools for directly assessing course outcomes, with a particular focus on evaluating ABET Student Outcomes (SOs) across four courses. The adoption of this digital assessment tool aims to streamline data collection, analysis, and reporting while reducing the manual workload traditionally associated with direct assessment. Through this pilot study, instructors have shared several key observations regarding the advantages and challenges of using BrightSpace for outcome-based assessment.

- The BrightSpace Learning Tool has significantly reduced the instructor's workload in the pilot course. Once students' achievements are recorded in BrightSpace for each assignment, instructors can efficiently retrieve and analyze the data at the end of the semester without requiring additional manual input or aggregation. This automation enhances efficiency by minimizing administrative effort.

- The Learning Tool provides a structured mechanism for monitoring the achievement of

specific course outcomes in a timely manner. By leveraging this feature, instructors can identify areas where students may be struggling and take proactive steps to reinforce and strengthen key topics in the classroom, ultimately enhancing student learning and overall performance.

- Course outcomes, mapped to program outcomes, along with rubrics for direct assessment, only need to be configured once. BrightSpace enables these course assessment components to be seamlessly exported and imported into future semesters, ensuring consistency in assessment practices while reducing redundant workload for instructors.

While the adoption of D2L Learning Tools offers significant advantages, successfully integrating them into a broader academic program requires additional groundwork. To ensure a smooth transition and maximize the benefits of this system, the following preparatory steps must be undertaken:

- Instructors need to undergo training to become proficient in using the system and understanding its assessment workflow. Familiarity with the platform is essential for effectively utilizing its features in direct assessment.

- Clear guidelines must be established for standardized implementation. This includes the adoption of uniform rubrics for certain assignments, defining appropriate assessment instruments, and determining the most suitable evaluation methodology—whether considering the highest achievement, the latest performance, or an average of multiple student achievement records. Standardized guidelines will enhance consistency and reliability across courses and semesters.

By addressing these considerations, the integration of D2L Learning Tools can be effectively scaled across programs, enhancing both the efficiency and accuracy of direct assessment while significantly reducing faculty workload.

In conclusion, this paper explores the use of D2L/Brightspace learning outcome tools to streamline the direct assessment of student achievement, particularly in alignment with ABET Student Outcomes (SOs). By replacing manual assessment methods with digital tracking and automated data collection, the approach improves efficiency, accuracy, and alignment with accreditation requirements. A pilot study in senior-level engineering courses demonstrates reduced faculty workload and more consistent assessment data. The paper highlights D2L's benefits and areas for improvement, emphasizing its potential to enhance curriculum evaluation and accreditation readiness.

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