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White Paper

Using Assessment Data to Effect Curricular Change and Increase Licensure Exam Scores

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Contents

Key Findings

A complete review of course and curricular effectiveness was necessary.

A 5-step process was established using ExamSoft.

A thorough evaluation was created. Results influenced curricular changes.

Introduction

Creating a learning environment that is most conducive to positive student outcomes is the core mission of all educators. Regardless of the level of education in which we work, we use a combination of similar components to create these learning environments — content, instructional methods, and assessments. While the goal is to continually strive to improve student performance, it is not always the motivation for what and how we teach our students.

For example, the curricula that institutions implement are often products of tradition or are dictated by the need to satisfy accreditation requirements. Furthermore, instructors tend to use instructional methods and assessment techniques learned during their time as students, from a mentor, or from trial and error in the classroom. Unfortunately, the question that remains unanswered at many institutions is how effective are these curricula and instructional methods at truly helping to improve student outcomes?

While educators can measure student outcomes by performance on their course exams, these evaluations are generally confined to simply evaluating performance in that class alone. To conduct a true review of course and curricular effectiveness, educators must conduct a larger scale evaluation of student success beyond the course level. Throughout all levels of the educational process, educators are tasked with appropriately preparing students for the next step in their academic or professional careers. When students are successful at the next level in their careers, this is validation that courses are truly successful.

For example, Oklahoma State University College of Osteopathic Medicine uses the national level one board exam as a true evaluation of effectiveness of the first two years of the program's curriculum. Students' success on this high-stakes exam provides a clear indication that courses are positively impacting student outcomes.

There is much to learn about our curricula beyond the correlation between a high board passage rate and a successful program. Using computer-based assessment programs such as ExamSoft, the very assessments we use to determine if students have learned the required content in our courses can also be used to evaluate our curriculum. The data that institutions receive on internal assessments can be compared with the results on licensing exams (as well as other standardized exams) to create a process that will positively effect curricular changes. Over time, the data from these assessments can also aid in predicting performance on licensure exams or even gauge career readiness.

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Creating a Process:

As with any program designed to evaluate and improve curricula, it is vital to first establish a sound process prior to implementation. This is the research process:

1. **Identify objectives for the study.**
2. **Define roles for the participants in the research.**
3. **Identify which data will be collected.**
4. **Create a process for data review.**
5. **Implement curricular changes.**

1. Identifying Objectives

For the sake of this curriculum improvement process, the objective of the study is to identify which areas in the curriculum were most effective in preparing students for their level-one board exams. Although this is an objective focused on one primary outcome, there are several components that make up this process. Along with identifying the most successful areas of the curriculum, the process will also reveal the areas that need the most improvement. Therefore, this creates the opportunity to maximize the effectiveness of the curriculum by continuing aspects that are leading to student success while adjusting areas that are not producing satisfactory student outcomes.

2. Defining Participant Roles and Responsibilities

Now that we have identified the objectives, we should determine participant roles and responsibilities. Not only must we identify the primary researchers and data collectors, but to create an effective process, we must also select the individuals who will enter the questions into the computer-based assessment program. Consistency is of the utmost importance when creating exam items and assessments, as the entirety of the data-gathering process depends on being able to use and understand a common language in the system. To ensure this consistent process, we highly recommend using only a select few to enter exam items into the system.

At Oklahoma State University College of Osteopathic Medicine, typically, any content-related categorization is faculty driven; however, when items are mapped into universal discipline groups, staff can more easily complete this process. For example, those staff that know faculty members and their discipline are able to associate the global discipline to their specific items; therefore, as long as questions are titled by the faculty member's name, staff can complete this part of the process. This illustrates exactly why role definition for each step of this process is so important prior to beginning this study.

It is best to title questions in a consistent fashion (i.e., inclusive of unit & course number, discipline/topic, and author name). Then, questions must be banked in a logical method such as in designated folders or courses. This enables item categorization to be efficient and accurate, whether it is done proactively or retroactively.

Next, we must make sure to identify a common nomenclature for assessments. It is key to include as much identifying information as possible when creating each assessment name to make it easily identifiable when data is collected. At a minimum, the assessment name should include the year, semester, course, exam number, and date given. Without creating a process in which the roles and responsibilities are clearly identified in a manner that suits your institution, the overall goal of positively impacting student performance on board and standardized exams is far less likely.

3. Identifying Data to be Collected

Knowing the objective, data collection will come from two sources — the board exam results from the accrediting organization and internal summative exam data from our institution. Regardless of the information that is provided by each accrediting and/or state organization, it is key to map exam items in the examination software in a way that will provide reliable data to create opportunities for meaningful curricular change.

For example, some medical school board exam results include a breakdown of how students perform in specific content areas such as physiology, pharmacology, pathology, etc. The accrediting body's content area or outline should be the foundation for internal curricular outcomes mapping; their content discipline map should be mirrored by the curriculum. While this can be completed retroactively, it will make the most significant impact when completed at the time of exam creation.

Data Collection from Multiple Sources

It is key to map exam items similarly to board exam content areas so that combined, you will have mapped data that is actionable and reliable.

Board Exam Results	Internal Summative Exam Data
Physiology	Physiology
Pharmacology	Pharmacology
Pathology	Pathology

4. Creating a Data Review Process

It is now time to collect and aggregate the data from summative assessments. You can do this as soon as each assessment is complete. The key is to collect all data that was categorized to match the board results information received from the accrediting body. Therefore, select the appropriate categories to receive results from all assessments that fit your study. After collecting the data, we are ready to compare it to student results on the board exams. Step one of this process is to evaluate in which areas of the curriculum students are most and least successful on the board/standardized exam. We now know which areas of our curriculum and assessments to study more closely to improve and which areas we should more closely emulate.

5. Implementing Curricular Change

Reviewing category data from internal summative assessments and comparing it to board statistics provides the information needed to begin the process of making tangible changes to a curriculum. Ideally, there will be a correlation between student performance in specific content areas on the boards and institutional summative assessments. However, even if this is not the case at your institution, there is still enough data here to create positive change. It is important to review all aspects of each mapped area to locate what changes need to be made.

There is no element of this process that is too small for our review. In fact, one of the changes that was made at our institution that positively impacted student board performance was as simple as balancing the quantity of exam items from each discipline on each exam. The categorization process revealed that some discipline areas were only assessed by a small number of exam items, while other disciplines were represented by many more items on the same exam.

As students came to understand the composition of the exams, they would devote less study time to the items that were not well represented on course exams. Therefore, the lack of questions in this discipline resulted in lower exam scores on those items and, eventually, lower board exam scores in this area. Using an exam blueprint to pre-define discipline breakdown helps to ensure exams are appropriately balanced and designed to evaluate the desired objectives. This simple change led to increased board scores in these content disciplines that were previously underrepresented on our exams while not negatively affecting student scores in other areas.

This example highlights the need to have a team of individuals that reviews the data from this process. Every area of curriculum and instruction needs to be evaluated to make a positive impact, including something as simple as a breakdown of exam item types used on assessments. Other changes we identified as part of this evaluation process included updating the number of course hours for specific disciplines within our systems courses, reducing the number of hours of certain courses within our curriculum and redistributing them to areas of student performance that needed to be improved, adjusting content sequence within certain courses, creating a new body systems/biomedical science integration course, and creating a faculty adviser program.

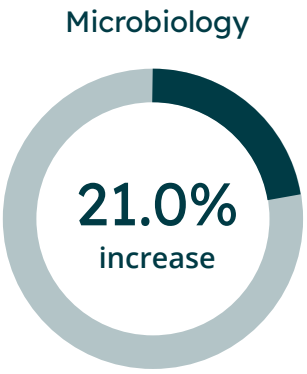
Changes Identified in the Evaluation Process:

- **Quantity of exam item types**
- **Evaluation and redistribution of course hours adjusting content sequences**
- **Creating new courses**
- **Creating a faculty advisor program**

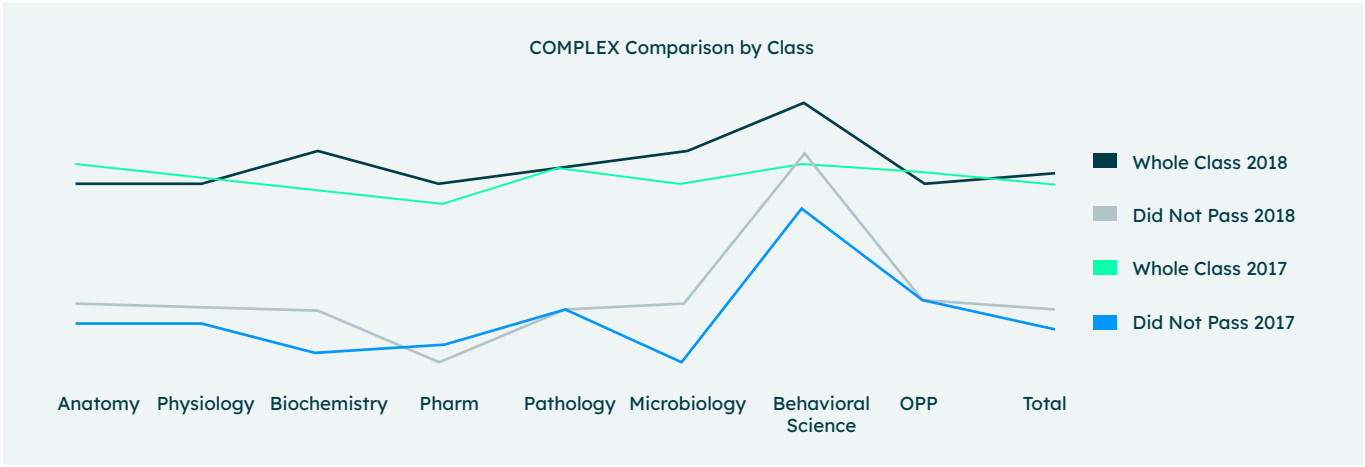
Results

In education, it is of the utmost importance to help students identify areas in which they can improve. As indicated in the table below, after implementing the previously mentioned changes, our institution saw an increase in student performance in all but one of the major board content areas.

Board Scores % Change After Curricular Adjustments	
Microbiology	21.0%
Pathology	0.5%
Pharmacology	6.5%
Physiology	1.9%
Biochemistry	10.3%
OMM/OPP	-0.8%
Clinical Anatomy	2.4%
Psychiatry	13.1%



Additionally, category scores increased between the classes of 2017 and 2018, which is when these changes were implemented based on exam data. This included improved average scores for the students who passed, as well as those who did not pass the board exam overall.



We were highly satisfied with the results of changes we made based on our data analysis that indicated that we were able to help all students improve their board performance, including students who struggled on the board exam. Due to these positive results, we continued to collect all exam data by discipline and compare it with student board performance. All curricular and instructional changes previously made have either been continued or added upon with continuous positive results.

Added Benefits

This process has proven to be a beneficial exercise for our institution, as it has created a thorough process of program evaluation at all levels of instruction. In addition, the statistical evaluation has served as a valuable faculty development opportunity — providing directed feedback on the questions included on their assessments and overall performance on their exams. In reviewing each aspect of teaching and learning, we have been able to better emphasize the importance of each stage of the instructional process.

Additional benefits include writing clear learning objectives, drafting assessment items that appropriately evaluate session objectives, and reviewing individual exam statistics as a method of evaluating instructional methods. Improving classroom instruction and assessment methods is proving to better engage students with course content and positively impact scores on summative assessments, which has proven to positively correlate with student board performance with previous classes. This, too, will be an element of our instructional process we will evaluate when the next round of board statistics becomes available.

After establishing a method to review how to positively impact student performance on board exams, we must now constantly review the process to ensure that it is sustainable. Additionally, there is a need for continued program growth. For example, the next step of development should be to evaluate how well our institutional exam results correlate with board exam results. This process has been set in place to allow us to construct all exams to best prepare students for board exams while also using our exams to identify which students are most likely to struggle on boards. The intended goal of this process is to use assessment data to create interventions that support proactive remediation for students, instead of starting a remediation study plan after a board failure.

Improving Each Stage of the Instructional Process:

Writing clear learning objectives.

Using items to appropriately evaluate session objectives.

Reviewing exam statistics to evaluate instructional methods.

Final Thoughts

As our students, technology, curriculum, and educational methods evolve, we must have a program in place to appropriately evaluate each of these elements to ensure we are continuously improving student outcomes. It is absolutely vital that we always keep this goal in mind to guide our decision-making, as it is our core charge as educators and institutions. If we continuously seek to evaluate program effectiveness using student assessment performance data, our institutions will be well-equipped to reach our ultimate goal of preparing students to be successful at the next level of their educational and professional careers.

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ExamSoft is the digital assessment platform that helps institutions achieve higher levels of course, program, and student success. With an intuitive testing application, ExamSoft makes it simple to create, administer, and grade exams, and generate detailed performance reports from the results — all to provide educators with a complete and accurate view of student learning.

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