King Saud University
Educational and Academic Affairs
Center for Excellence in Learning and Teaching

Using Technology to Identify Students Previous Knowledge

Educational Situation:

Dr. Zaid, the course instructor, enters his first lecture of the semester and begins by asking his students about some concepts in the course. Dr. Zaid assumes that the students are familiar with or have mastered some of the concepts. Which finds a variation in the students' levels, even in the accuracy of their answers to the basic concepts required for the course, and differences in their previous knowledge. He also notices that some students are avoiding participating, while he can't figure out a specific reason behind such a behavior. Dr. Zaid tried to ask them questions directly, but to no avail. So, the course instructor finds a challenge in determining the student's previous knowledge and motivating them to participate during the lecture. Where previous knowledge and students' participation are considered a pillar to cognitive development, determining progress in academic topics, and establishing the appropriate methods for instruction.

The Issue:

One of the main problems that the course instructor may face, is the ability to determine the previous knowledge of all students, especially in large classes (a large number of students) or in irregular classes (variation in levels). Particularly in the first years, where the number of students in classes is large and shyness is spread among students at the beginning of their university journey, leading to a lack of participation and hesitancy in providing potentially inaccurate answers. Therefore, it is beneficial to become familiar with advanced technology tools that help engage students and gain a better understanding of their level of knowledge and expectations in psychologically safe and supportive learning environment. This approach

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benefits the course instructor by allowing them to assess their student knowledge quickly and effectively for successful course management.

Teaching Practice: Identifying Students' Previous Knowledge by Using Technology Tools

There are many of programs and applications available to assist in implementing this strategy. Some of these display results immediately and interactively without showing participants names (optional). For example, PullEverywhere and Mentimeter. PullEverywhere was chosen for its ease of use and several free features are available. So, this tool is available to students before the lecture and helps track their progress based on their results in discussions and explanations. Multiple-choice questions can be set up, and an assessment of the lecture topics can be conducted via QR code. Students can access the site and submit their answers directly through their phones or tablets, with results displayed immediately on the projector. The site also allows for tracking the number of participants in responses and encourages all students to participate, giving them enough time to answer. Additionally, dividing the students into groups and conducting a competition among them for the fastest five correct or distinguished answers!

Furthermore, the same tool allows for creating a "word cloud", which can be used for students to express the meaning of the concept (before the lecture starts) with just one descriptive word. After the explanation, students can then participate again in creating the word cloud. Each time, there will be differences between the two word clouds, indicating modifications in some concepts or variations in their depth. Then, open the discussion and observe the differences between the two word clouds. Using the same site, a few minutes before the lecture starts, display to the students an assessment of their weekly achievements and identify any updates

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through an innovative interactive slide where students can select what best represents their progress. This undoubtedly helps in identifying perceptions and expectations during the lecture and finding ways to influence students. To enhance the dialogue and introduce a new method for students to share their ideas and their answers through direct and interactive expression, the course instructor can activate a feature in PullEverywhere that allows students to write sentences from their mobile phones or tablets, which will then appear on the shared screen. This way students can compare their thoughts and reflections, share strengths and areas for improvement with their colleagues, thereby raising their level of knowledge.

Implementation Procedures:

- **Before the Lecture:**

- Preparing before the lecture by identifying the main knowledge intended to be evaluated among students.

- Registering in the website of the service (https://www.polleverywhere.com) and reviewing the terms, conditions, and usage guidelines.

- Uploading questions to the website based on the goal to be achieved (evaluation – direct questions – word cloud – open-ended questions).

- Announcing the lecture to the students via the Learning Management System (LMS) and ensuring they are encouraged to bring fully charged smart devices (phones or tablets).

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- **During the Lecture:**

- Starting with a simple Question (e.g., a question about their feelings regarding their achievements in the course or during the week) on the website to test the response and give students enough time to familiarize themselves with the system.

- Emphasizing the fact that the evaluation and the activities will not be graded, the goal is to understand their levels to help them better understand the topics.

- Presenting the questions related to the previous knowledge required for the lecture concepts.

- Asking students about any challenges they faced with the activity or the experience (if any) and trying to resolve it immediately (for example, by sending the activity link through Blackboard also presenting the link on the classroom projector).

- Ensuring a psychologically safe environment, allowing everyone to participate, and supporting the students.

- Presenting the activity and sharing the answers immediately, while observing patterns of errors or thinking.

- Discussing the results with the students and starting to explain the concepts based on shared knowledge.

- **After the Lecture:**

 - Reflecting on the experience and the main challenges that the students faced (if any).

 - Modifying and developing the content continuously in line with the students' level for future lectures.

 - Switching and varying activities based on the goal, and using different tools within the options available in PollEverywhere.

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Examples:

Example 1: Asking students about how they have been doing during the week at the beginning of the lecture in a creative way to create a safe and friendly environment and discussing with them how can they improve their performance and feelings. When applying this the slide shows the majority have not experienced an improvement in their sleep during the first weeks of the semester.
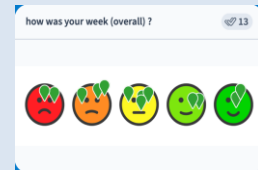
Example 2: Asking students to participate in the questions about previous knowledge, then presenting and discussing the differences with them. Differences in responses are observed and quickly listed using the PollEverywhere.
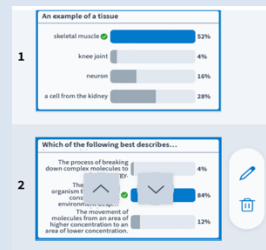
Example 3: Using a word cloud where all students contribute with a descriptive word about a concept before and after the explanation. Discuss the changes in the shape of the two word clouds, the words used in each one, and the patterns of variation.

Example 4: Identifying a model of open-ended questions for instance, the main difficulties and concerns in students' minds, making it easier to address and discuss them.

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Resources

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