

## Innovative ways of student engagement for active learning in science courses of nursing in the four year baccalaureate programme

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### Abstract

Active learning strategies with innovative ways are used in the teaching and learning for the engagement of students in classroom settings. A number of studies talk about the benefits the students have shown while using the active learning methods in their science courses, like Biochemistry, Anatomy and Physiology, Microbiology and Pathophysiology. Active learning helps to retain material, motivate students and to develop thinking skills. In the science courses of nursing education, these are very much in use for developing critical thinking qualities. By applying active learning strategies in science courses of nursing education, one may clearly see how the students get engaged with the content. Some of these activities are interactive simulations, games, small group discussions, videos, blended learning, role-playing, pair share, flipped classroom, mini research projects, formative evaluations, quizzes, hands-on activities, etc.

**Keywords:** Learning strategies, Innovation, Active learning, Student engagement, Nursing education.

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### Introduction

Teaching and learning are two different sides of the same coin. The most known rule for estimating great teaching is the measure of student learning that happens. Higher education has been studied with regards to student learning, touching the possibility that establishments may consider elective approaches to convey educational plans to satisfy the needs of the increasing amount of information the students would like to have in order to use it for post-graduation. Active learning (AL) has turned into an elective choice parallel to traditional teaching (TT) methods.<sup>1</sup> A reason for concern is the limitation of the traditional class in supporting newer learning approaches.<sup>2</sup> A recent research emphasised that students adapt more from AL compared to TT strategies. It has always been a challenge for the faculty to apply new innovative ways to engage their students in active learning. AL methods help students move away from being "spoon-fed" facts and figures to developing concepts, understanding principles and applying knowledge in practice.<sup>3</sup>

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AL enables students to learn in the class room with the assistance of the teacher and different students, instead of learning alone.<sup>4</sup> Consequently, the AL concept has received increased interest. AL is a wide concept, most often referring to student-centred and activating instructional methods and instructor-led activities.<sup>5</sup>

AL is broadly known to be effective in helping students to hold new information better and for longer and in creating progressive educational frames of mind about learning.<sup>6</sup> Over the past decade, the education system has experienced a shift, with more emphasis on student engagement and AL. Teaching of sciences by using various innovative strategies that are creative and student-centred is now being practised. When the faculty is using innovative teaching-learning strategies, students' understanding improves and they show improvement in their academic achievement.<sup>7,8</sup>

The current review was planned to compare the learning experiences of Baccalaureate first year students at the Aga Khan University School of Nursing and Midwifery (AKUSONAM), Karachi, focussing on science courses i.e., Anatomy and Physiology, Biochemistry for Nurses, and Microbiology. It has been observed that when we use too many power-point presentations, the students start feeling bored and it becomes a dry lecture. Instead, when we incorporate case studies that include visuals, videos and lab reports, students feel engaged in the discussions. At times, pre-readings or home assignments help students to come to the class more prepared and they remain more engaged in the discussions.

### Background

People born between 1982 and 2002 are called 'Millennials'.<sup>9</sup> These students are also referred to as "digital natives"<sup>10</sup> because of their comfort zone with technology and digital media and this connectedness has led the generation to lean towards multitasking and a more social environment in all aspects of life. Therefore, the learning environments also demand a shift from traditional lecture-based experience to a more engaging and innovative one. It is significant to make an environment of learning so active and engrossed that the students engage themselves in class room activities rather than sitting silently and listening to the teacher during the class.<sup>11</sup>

For the above-mentioned reasons, new pedagogies under the AL umbrella are incorporated in the education systems that focus on student learning and their engagement in the learning process.<sup>4</sup> It aims at modifying the traditional surface learning paradigm into a deeper learning paradigm. Four broad categories of instructional approaches for use in an AL classroom have been identified, including individual activities, paired activities, informal small groups, and cooperative student projects.<sup>12</sup> These approaches include many pedagogies, such as brainstorming, concept maps, problem-based learning (PBL), case studies, role-playing, project-based learning, classroom presentations, self-assessment, etc.<sup>12</sup> When students get engaged in the AL process, they relate more with the course content through the various activities mentioned above.

As AL has become the demand of the time, many innovative ways are used in the science courses taught at AKUSONAM. These approaches were found to be effective for a collaborative as well as PBL experience, leading to a thorough understanding and intellectual review of the modules. AL mirrors authentic practices of analysts endeavouring to deal with solid issues, providing the students with an opportunity and intellectual freedom to explore beyond the traditional classroom setting.<sup>13</sup> Research has shown that students participate actively in cooperative learning activities due to which the outcomes are higher, there is better retention, students show positive spirit about each other and about the subject matter, and there is stronger academic self-esteem related to competitive and individualistic learning.<sup>13,14</sup> Furthermore, group collaborations also assist students to improve interpersonal skills, such as better-quality communication, leadership, sense of responsibility, team work, cognitive skills, decision-making and conflict-resolution.

Most AL activities fall under the blended learning mode. Blended learning associates multiple pedagogies intended to complement each other and enhance learning and application-learned behaviour.<sup>9</sup> Blended learning incorporates face-to-face classes, e-learning, virtual lectures, self-learning, creating a balance among traditional synchronised class settings and individualistic learning environment. Additionally, the millennial students require more technology-friendly and variable-delivery media that is not monotonous in its core.

The Virtual Learning Environment at AKUSONAM is the best platform for accommodating blended learning in the science courses. It has greatly helped to provide the students with a variety of learning media, including vodcasts, voiceover presentations, quizzes, group forums, social areas, etc. These have contributed to higher

participation from the students. Moreover, the students are able to refer to learning materials from international universities. Blended learning further facilitates the students to access the courses at their preferred time from the place of their comfort, which improves the learning experience to the fullest. The following are the different innovative ways of student engagement incorporated in teaching science courses of nursing in the baccalaureate programme at AKUSONAM:

### **Flipped classroom**

Flipping the classroom engages students, making it easy-to-use, readily-accessible technology in order to free class time from lectures.<sup>14</sup> Faculty adopting flipped classroom provide lectures and information as homework. This requires the students to review the referred material through available media which may include internet, books, handouts, discussion forums, voiceovers, etc. Hence, the students must come prepared for the class beforehand.

The flipped classroom setting proves to be beneficial in many ways for the science courses, allowing saving class time by avoiding oral and extensive lectures.<sup>15,16</sup> The saved time is then utilised for clearing confusions, discussing detailed concepts, collaborative activities, intellectual discussions, practical work, etc., improving the whole teaching and learning experience.<sup>17</sup>

### **Formative assessment**

Formative assessment is a process in which students learn, evaluate their progress with the given set of standards, and then revise accordingly.<sup>15</sup>

Regular formative assessments at AKUSONAM through its Virtual Learning Environment as well as in classrooms using a variety of technology-based activities give students a greater agency to enrich their learning in science courses and to develop more independence. Furthermore, it contributes to the development of critical reviewing skills and enables the learner to evaluate their own performance through reflective practice.

### **Oral presentations**

Communication and presentation, planning and problem-solving skills help student to achieve success not only in their academics, but also for future works.<sup>18</sup> These oral presentations in the science courses enables students to fully participate in learning, and helps them develop competencies in the area of communication. It further works in gaining students' attention and creating challenges. These presentations in many ways allow the students to enjoy sharing their knowledge with the audience in a more planned and constructive way. Additionally, oral presentations benefits the faculty in

developing facilitating skills and the students gain more confidence in delivering their ideas to the public.

### Research-based projects

Research-based project is one in which the primary goal is to acquire knowledge of some kind or to resolve uncertainty.<sup>19</sup> It requires not only a clear title of the research and goal, but also a supervisor with good experience and research equipment. Research-based projects allow the students to formulate a hypothesis which they prove using scientific methods. Research in different streams and disciplines has become increasingly important and research in healthcare is continuously progressing. It raises personal and professional challenges beyond the bounds of readily-available information. For the students, it expands their understanding and knowledge of their field and research itself.

### Interactive technology in class

As the use of computers has increased in daily life, the students are becoming more “visually literate”. Interactive technology is used in the class by the instructor to deliver the lesson or to have a thorough feedback of students about their understanding and learning. This greatly helps in engaging passive listeners in the classroom. In the science courses at AKUSONAM, game-based learning platform is widely used, such as ‘Kahoot’. Its multiple-choice quizzes are accessed through phones anytime in the class and are used to learn the science course with some fun. Another online board used is ‘Padlet’, which allows displaying information and answers given by the students in response to the teacher’s question. The students become more engaged in the learning material as they take ownership of their own learning through interactive technology.<sup>19</sup> Another such fun learning strategy is the role-play. It is a very interesting strategy which can also be used as ice breaking activity. Nursing students can act as patients, attendants, staff, and can prepare a small play that can engage the rest of the class and thus create an active learning class.

### Practical work

The purpose of science education is to empower students to develop a comprehension of the natural world: how it works and how we can explain and predict its behaviour. This is done by giving carefully organised activities in which students watch or interface with genuine things and materials. These activities are commonly done in demonstrating labs or science labs. Practical work is considered an essential part of the learning methodology.<sup>20</sup>

The science lab at AKUSONAM allows students to work in small groups and perform lab-based practicals on the

topics designed by the faculty. They are assessed through critical reasoning and discussions at the end of each lab session based upon their performance, observation and reasoning.

### Discussion

AL is the need of the hour because it enhances motivation and curiosity, and engages students in the learning process. A number of innovative AI strategies are used in teaching the science courses and they have been found to be effective for a collaborative as well as problem-based learning experience.

As shown by literature, the AL task is tremendously refreshing<sup>21,22</sup> and is a way towards promoting students’ involvement in class room exercises.

Learning is a continuous process<sup>23</sup> and, in addition to commitment, the instructors need to make the students realise the significance of discussing and questioning within the learning process.<sup>24</sup> For instance, if the students are inaccurate during a discussion, this is not a dreadful thing, but an opportunity to empower them to end up being actively agreeing on the basis of precise information.

When the instructors can generate open teaching-learning discussion with students, the students are likely to feel engaged and their learning gets improved.<sup>25,26</sup>

AL is a student-oriented process that elevates the students to end up being adequately and effectively equipped to optimise learning opportunities.<sup>27-29</sup> It has been observed that the millennials are more technology-friendly, while our education system has a limitation of having a faculty that lacks AL training. There is minimal research data available in the context of AL’s impact in science courses of four-year Baccalaureate nursing programme. As such, the current review could not compare its observations about AKUSNM’s experience with relevant literature. This is a limitation of the current review.

### Conclusion

The innovative AI pedagogies play a vital role in engaging the students in the learning process. Such platform need to be provided to improve engagement and motivation of students.

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