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Perspective

Bridging the Learning Gap by an Innovative Induction Session of an Integrated Basic Science Course for Allied Health Science Students in Nepal

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Abstract

At the start of each course, students feel overwhelmed and unprepared. The vastness of content covered in any course of undergraduate school can become daunting. Thus, an inductive buffer session is designed as an "Introduction to disease" at the start of each system-based basic science course so that each student can familiarize themselves with key concepts for better upcoming sessions in a low-resource setting. The session incorporated common case studies and supplemented them with visual or physical materials that the students were already familiar with. When we argue for adopting inductive methods, we do not propose the complete avoidance of didactic lectures and relying solely on self-discovery. Rather, our approach emphasizes wherein induction preempts deduction.

Keywords: allied health science, basic science, induction session

Background

Currently, sweeping changes are causing a revolution in the education of health professionals across the globe. More than ever, educators are grappling with the challenge of developing courses with new content, delivery formats, and assessment methods. This growing interest in designing the best learning experience is resulting in

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a robust and evolving curricular framework worldwide (Orozalieva et al., 2021a). However, endeavors to initiate educational reforms to align the contextual requirements of the country have lagged behind Nepal for numerous reasons(Adhikari & Mishra, 2016). Notable challenges such as centralization, affiliation model, budgetary constraints, and inadequately trained educators have hindered the effective bridging of learning gaps. Nevertheless, Madan Bhandari Academy of Health Sciences (MBAHS), granted with authority to design and develop its own curriculum, has taken a proactive step in tailoring it's educational model to meet the distinct student's needs and available base resources. However, the institution was confronted with significant hurdles stemming from constrained resources and educators' limited grasp of educational philosophy. Thus, creating an authentic learning experience in a low-resource setting was an immense undertaking. This curricular note aims to spotlight one of the academy's transformative attempts arising out of the necessity to narrow the learning gaps despite resource constraints. Based on the problem-based learning (PBL) philosophy, we present an innovative induction session- " Introduction to Disease". This session serves as a vital entry point for each system-specific basic science course, acquainting students with common diseases that will progressively unfold in their learning journey through seven basic science subjects. Here, the aim is to go beyond documentation to explore practical solutions. This note strives to innovate and perhaps inspire health professionals and educators of low-income countries struggling with resources for contextualizing curriculum development. However, this note focuses on the basic science course for first and second-semester students of the allied health sciences programme. The allied health sciences programme at MBAHS encompasses Bachelor of Science in Medical Laboratory Technology, Bachelor of Public Health and Bachelor of Pharmacy. By proffering this approach, we aim to precipitate a broader discourse on developing enriched learning experiences for students in middle-income countries like Nepal

Designing of Session

The objective of designing this session was multifold. Still, the major focus was designing a session to create a parallel approach as a substitute for resource-demanding problem-based learning. Adhering to the tenets of problem-based learning models, students were initially introduced to carefully developed cases relevant to the specific system in the inductive session. Such an approach is imperative to nurture critical

thinking by encouraging interdisciplinary correlations. Active learning is one of the major principles adopted for designing optimal learning experiences. It has been weaved into different university education models as a conduit for authentic learning (Trullàs et al., 2022). Additionally, the session aimed to guide students in developing structured study plans to facilitate their learning experience. The cases were developed around prevalent diseases aligned with the curriculum goals of the specific system that students were likely to unfold in forthcoming sessions. Hence, by commencing the course with a familiar scenario, the session sought to nurture an active learning process. The sessions were contextualized in real-world settings encompassing risk factors, disease presentation, disease prevention, and tangible associations such as medical equipment, awareness campaigns, etc. Therefore, the session centered on the core concept of interdisciplinary integration, as subsequent sessions offered more profound exploration through seven basic science subjects. Thus, this pedagogy is expected to mitigate students' feelings of being inundated by curricular demands and facilitate a seamless connection between learners and the contents, promoting an engaged learning process. For example, one of our courses is CB116 (Cardiovascular system). The first session of CB116 would be a discourse on diseases such as Myocardial infarction, Rheumatic Heart Diseases, Congestive Heart Failure, Infectious endocarditis, and Arrhythmias. The session would cover the real-life presentation of diseases, how the disease unfolds in each course, and the study plan for learning about that disease. Students would then be taught to make meaningful connections between various concepts, thereby enhancing their critical thinking skills. Hence, the session is based on the following maxims of teaching:

- From Known to Unknown: This session discusses the commonly encountered diseases familiar to most health science students.
- Simple to Complex: The cases presented signs of disease that were simple in nature
- Concrete to abstract: Common diseases are considered concrete concepts as they can be directly experienced through sensory perception.
- From whole to part: The diseases are presented in entirety, and each subsequent session unravels the disease from each subject’s perspective

- From Psychological to Logical: The diseases presented are common and can be understood by students.
- From Analysis to Synthesis: Introduction to disease is the analysis phase, guiding students to deconstruct the disease into its components by presenting cases. In subsequent sessions, students explore each subject, thereby synthesizing the information by integrating the knowledge gained.
- From inductive to deductive: In the inductive approach, the contents are introduced via study cases or problems, followed by subsequent lectures on various subjects involving the analysis and exploration of theories (Vallikat, 2021).

Feedback

A targeted feedback was conducted, wherein two students were purposively selected and invited to provide feedback regarding the inductive session. The selection was made based on the cautious judgment of students who could offer sound feedback related to the session.

Students A1, female, second semester shared,

> In the introductory classes, diseases of particular systems were mainly discussed, highlighting the lessons to be covered. This sparked my interest in the course and tested my prior knowledge. I was more engaged with the class lectures and connected what I was learning to what I already knew. I learned how to connect different subjects and what topics to focus on. Also, it helped me to become more interactive in class and prepare for upcoming lectures. It was much easier to understand the course content by attending introductory classes. It would be extremely helpful for me to select a field or subject that suits my interests if I know the subject matter beforehand. It helps me prepare better for the challenges that I will face. [A1]

Student A2, male, second semester shared,

> The first session helped us relate to real life, but only within the context of pathology. During the facilitator's presentation, he focuses primarily on pathology aspects, not on anatomy, physiology, microbiology, or biochemistry.

> Not other subjects, but the upcoming pathology class was the benefit of the session for me. [A2]

Such diverse perspectives from two students substantiate the learning needs of students. Thus, the feedback suggests that there is room for improvement; particularly, the educators need to be trained to create a session with a balanced representation of all aspects of disease. Therefore, facilitating learners' grasping of the interconnectedness of concepts requires collaborative efforts from different disciplines. The gathered feedback can be thus utilized to make adjustments to sessions as necessary.

Discussion

The introduction to disease was introduced to first and second-semester students of the allied health science program of Madan Bhandari Academy of Health Sciences as an inductive session for system-specific basic science courses. This innovative approach was sought as an alternative to the resource-intensive approach of problem-based learning. Problem-based learning is a departure from didactic lectures to adopting student-centric and student-led learning, which was first introduced at McMaster University, Canada, in 1969. This shift from heavy reliance on didactic sessions has been acknowledged and adopted worldwide. It has been incorporated into different university education models to confirm teaching with authentic learning. In PBL, the initial hook point is a challenging scenario or case. This challenging scenario intrigues the small group of students to discern the problem, outline the fundamental concepts, brainstorm ideas, and generate key learning objectives. In the subsequent session, group members research and share the topic with the group. Each group is assigned a tutor who keeps them steered in the right direction (Trullàs et al., 2022). Despite introducing the disease as a substitution for problem-based learning, the students were provided with valuable opportunities to engage in meaningful learning experiences.

In health professionals' education, learning experiences created by instructors often follow deductive sessions. The instructor typically begins a topic by lecturing on general principles and subsequently explores the applications part. Regrettably, no attention is given to providing students with the relevance of the knowledge imparted. Hence, the fundamental aim of learning is rarely stated as “why” learning is generally not emphasized. This results in learners acquiring the knowledge merely due to its curricular inclusion. Therefore, this gap highlights the need for a more relevant

approach that triggers the learning process by presenting real-world examples as a primary hook. The learners shall then draw a relevance in deeper learning of theories. This method is in line with a well-accepted tenet of educational psychology, which states that individuals are most motivated to learn things when they realize the clear need for knowledge (Ferlazzo & Sypnieski, 2018).

Hence, a promising alternative is sessions where the instructor provides tangible examples and challenges learners to identify patterns instead of initiating the session with general principles and gradually getting to applications. As students set out to analyze the practical examples, they naturally develop a need for information in the form of facts, theories, and principles. Instructors can then facilitate the students in identifying the learning resources (Martínez et al., 2016). This way, learners can critically assess and reconcile their pre-existing knowledge with newfound insights. A simple way to explain this concept is by the " Ikea Effect," a psychological phenomenon that states that when people invest their effort in constructing or creating something, they place a higher value on it (Norton, 2012).

Introduction to disease sessions are rooted in constructivist learning theories, i.e., students construct their own knowledge rather than passively receiving knowledge from their instructors. Based on constructivist learning theory, the sessions leverage the learner's familiarity with the content to establish a firm groundwork for a deeper understanding of the subject matter. New information is presented to students in contextual practical examples to facilitate learning (Prince et al., 2006). For example, in the introduction to disease session of the cardiovascular course, we presented students with a case study of hypertension. To spur their interest, we supplemented the case study with a sphygmomanometer, examples of foods that increase the risk of the disease, and posters endorsed by the government or non-governmental organizations to spread awareness regarding hypertension. In contrast to the compartmentalization teaching approach, the first session integrated aspects of the particular system. This technique resembles problem-based learning, where groups explore a case in a group without teacher guidance. The introduction to disease diverged because the instructor would read out the case to the students and systematically steered the learners through constructing knowledge regarding the disease discussed. This thus led to student-centric learning, clarifying their doubts, and receiving facilitation from the instructor. This technique thus combines scaffolds for the learning and learners' construction of

knowledge. Instructors offering roadmaps and explanations support learning and thus provide a framework for students to construct their own knowledge. The case study allows learners to make connections and draw conclusions, making their learning process meaningful. This session can be likened to an orientation session for any activity.

Conclusion

Adopting an innovative pedagogical approach to inductive sessions as an initiation point of system-specific basic science courses can be a promising approach for first- and second-semester students of allied health science programmes. This case-based study approach, which is reminiscent of more resource-extensive problem-based learning, empowers students to construct their own knowledge. Therefore, instructors can bridge the disparities by structuring learning around authentic and real-world problems, thereby imparting meaningful learning experiences. Hence, we recommend using an introduction to diseases as an inductive session to enhance learning experiences, which also exemplifies how meticulously crafted sessions can transcend resource limitations. To meet the diverse needs of students and embrace the expanding demands of healthcare, a shift in approach for ushering in transformative learning is imperative.

Key Points

- Inductive sessions are less commonly used in health professions' education than deductive sessions.
- Educators of higher education from low-resource settings are often challenged to incorporate inductive sessions as they require extensive resources.
- Health professionals and educators can employ inductive sessions, such as introductory sessions in basic science courses, as a sub-optimal alternative to resource-consuming problem-based learning.
- These sessions may not fully replicate other authentic learning experiences, such as problem-based learning.

Disclosure

The author declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

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