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Bridging Research and E-Learning: Theoretical and Practical Challenges in University Teaching

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Abstract

Higher education authorities in Pakistan have been exploring new dimensions, ways, and strategies to make the teaching-learning process effective. Online teaching is one way to address the challenges of physical learning, and a research-based approach engages students by allowing them to investigate comprehensively. Research-based teaching approach in online classes requires teachers to collaborate closely with students and provide comprehensive guidance and learning. This qualitative study explores the theoretical and practical challenges teachers faced during online lectures at the university level. Data for this study were taken from 17 university professors through in-depth interviews. These professors have taught online classes via Zoom, MS Teams, and other platforms. Findings of the study revealed challenges in both theoretical and practical learning, such as students' inability to understand theoretical concepts and apply them to practical research and real-world problem-solving.

Keywords Online Teaching, University Professors, Theoretical Challenges, Practical Challenges, E-learning.

Introduction

Theoretical and practical teaching that integrates with research is an intellectual art that requires high-quality instruction and focused student learning. Such a teaching approach becomes difficult in an online setting. It is believed that teaching theory and practical skills that generate research-based learning is really challenging in the e-learning process (Ayeni, 2011). This process demands a mastery of various techniques and approaches. The teaching and learning process refines cognition. The revised Taxonomy identifies and describes 19 cognitive functions organized into 6 categories. Of these cognitive functions, 2 are associated with the Remember category, while the other 17 are linked to the remaining 5 higher-order cognitive functions: Understand, Apply, Analyze, Evaluate, and Create. (Rote vs. Meaningful Learning and Theory to Practice. Richard E. Mayer, 2002.) The pandemic has disrupted the world, and every nation has responded by devising new techniques and methods to manage the aftereffects. Technology has also shifted to new and different strategies for effective teaching and learning. The challenges posed by the shift to technology and the refusal to take a big leap away from readily available tools have led to an increase in the use of online classes. With teacher-developed measures to guide the learning process, the focus remains on the student, as the process begins to facilitate active learning, as noted by Érica Maria Granjeiro (2019).

Literature Review

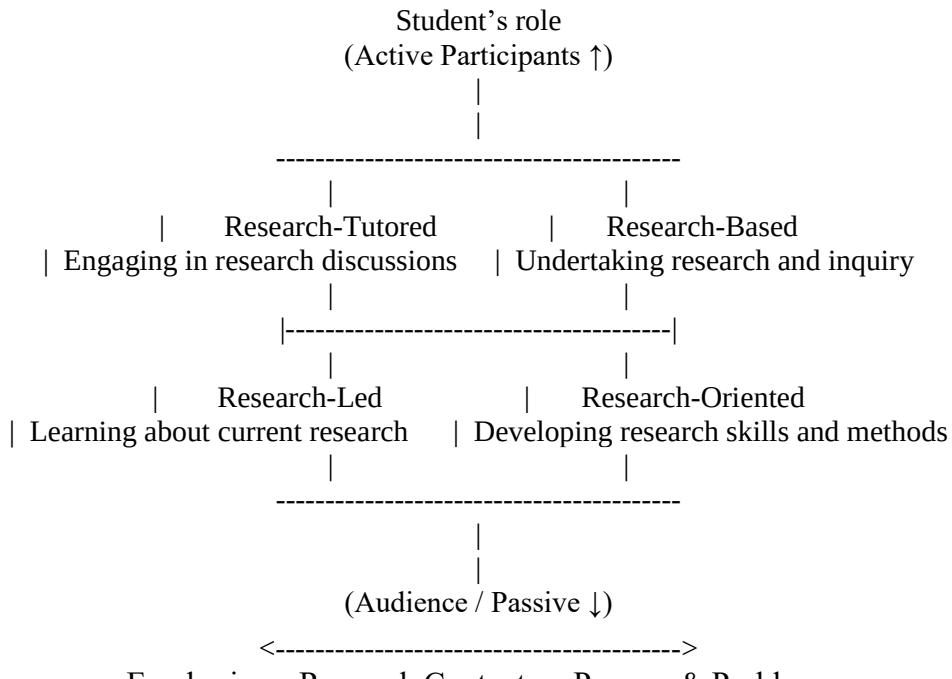
Practical teaching through theory and research helps students develop an investigative mindset, enhancing their conceptual understanding and advancing significant knowledge. According to the Italian conceptual analyst Ceccato (Glaser, 1998), the importance of the environment is delineated: the best way to instruct the child is to indicate where to focus, then instruct him to chart his own processes. Draper in 2002 and Barrell in 2007 argue that learning involves an individually constructed

understanding, regulated through cooperative and social learning, which engages students in real-life, meaningful tasks. This creates a base through which students learn their discipline, alongside acquiring other educational traits. They become critical thinkers, perseverant in their studies, and skilled at understanding and, over time, maintaining a progression in their practice and knowledge of the discipline. For this purpose, research-informed teaching is critical. There is great flexibility for educators in deciding which research-informed teaching methods to employ, and, for that reason, method-oriented, research-oriented, and teaching-oriented approaches will be operational. Kansanen (2007), Krokfors (2007), and Westbury et al. (2005) examine research-based teacher education and argue that all courses are research-based and contextual, and that students approach continuing pedagogical issues with curiosity.

The aim of these authors is to educate self-sufficient reflective teachers who may operate as practitioner educators and researchers. It is not the aim to produce researchers. Rather, the aim is to equip students with the skills and knowledge to apply and teach, and to evaluate their students' thinking. The authors encourage the development of thinking communities that reason, compare, discriminate, and analyze what seems disparate and confusing. The connection between research and teaching dates back to the early 1800s at the German Hochschule. This method was developed and supported by the philosopher Alexander von Humboldt, who believed that combining teaching and research brought about new knowledge when both teachers and students became engaged co-researchers. Teaching is guided by students' own study and research. In 2007, Haverhals even argued that Humboldt's ideal research-centered education stemmed from students' passionate pursuit of the truth, and that this realization reflected students' ideal intellectual engagement. The so-called "bottom-up transformation of society," as Haverhals said in 2007, was the goal of social transformation. As for now, European universities, the so-called inquiry and research universities, are not what Humboldt envisioned in his ideal, "trendy" university. Academic researchers drive new theories and points of view, but do not always bring methods for better teaching to the public. Fairweather (2008) picks up on the nervousness STEM lecturers have with the unrealized potential of effective methods in the teaching prospects of a study with the National Research Council Board of Science Education.

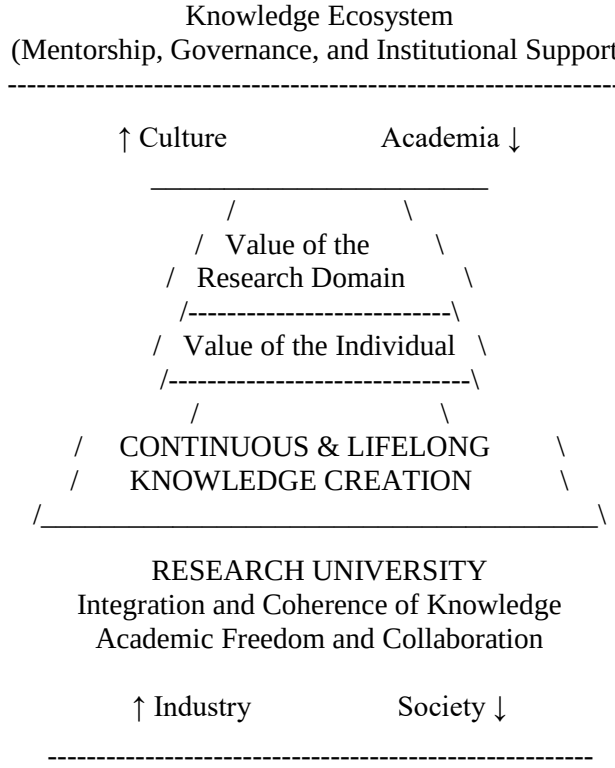
According to both Jenkins (2004) and Jenkins and Healey (2009), research and teaching are not seen as mutually exclusive tasks. These relationships should not be seen as exclusive to research or teaching-oriented institutions. Nonetheless, institutions face a range of issues in maintaining the relationship between research and teaching. In 1976, Piaget expanded the articulation of cognition to encompass the assimilation and accommodation of knowledge and the construction of social reality, a conceptual characterization to the paradox. Graduates and undergraduates attempt to assimilate, essentially 'acquiring' knowledge; cognitive change and effective learning happen only if the new knowledge is inextricably knit to present knowledge and superimposed on social experiences and structures. The cognitive developmental theory postulates that students should be able to participate in discussions and that the cognitive conflict and the ambiguous phase, characterized by substandard reasoning, are addressed, leading them to construct frameworks and synthesize models. Constructivists such as Vygotsky, Piaget, and Glasersfeld believed that children learn in social settings with other children. The environment is a great contributor to the information they construct, to social reality, and to rational knowledge. This environment has been responsible for changing the attitudes toward learning and teaching, not only among students but also among teachers. Students learn the methodology of learning and the skills needed to construct knowledge independently in a given field. This endows the student with the ability to think critically, to maintain a perpetual desire to learn, to acquire and reproduce novel knowledge, and, eventually, to enhance the knowledge that underpins a discipline.

Figure 1



Independent research serves as a pivotal aspect of research-based learning. In these cases, students apply research methods while developing research questions, monitoring research progress, processing collected information, and improving various other competencies. While learning to manage various degrees of uncertainty, students build confidence, independence, organizational skills, and teamwork. Humboldt's university teaching concept, in which teaching and research are complementary, and Newman's ideal of teaching and research, where students are stimulated to engage in communal research and develop thinking of a higher order, are the origins of the research-based learning methodology. As Newman states, there is reasoning, comparison, discrimination, and analysis."

Figure 2



The integration of teaching and research dates to the early 19th century in German universities. This approach suggests that, as the research and teaching feed off of each other, students may benefit from the integrated practice of the two. Research in the context of education and the Humboldt ideal helps construct students' search for truth that may otherwise not have been pursued within pure academic inquiry. Students were led to the will of constructing truths in order to guide society's transformative process through pure inquiry, or the will to know, to avoid the process of mere opinion that may have the potential to guide the transformation of society as described by Haverhals, 2007. Researching academics are not necessarily interested in investing time and effort into innovations in teaching. According to Fairweather (2008), the researchers in the STEM area demonstrated opposition to the adoption of more efficacious teaching practices as part of a report to the National Research Council Board of Science Education. This line of thinking suggests the development of a research-based learning paradigm, in which students learn to address questions, problems, and unknowns in collaboration with their peers. Therefore, by learning this process, students not only learn to think critically, build new knowledge, and make a gradual contribution to a discipline's knowledge, but they also advance that discipline's knowledge.

Originating in the early 19th century, the Humboldtian education ideal is a philosophy of academic education that approaches the art of learning through an integration of research and inquiry. The ideal of the Humboldtian Model is to intermingle the sciences and the arts with research activities, and in turn, entrepreneurship (pragmatism). Even today, the Humboldt Model is employed to practice learning in an integrated manner.

Methodology

The methodological application of this study was guided by interpretive epistemology. Using an interview guide, 17 in-depth interviews were conducted with the university professors across different universities in Khyber Pakhtunkhwa. These professors were recruited to teach while bridging theory and research through their online teaching methods. After collecting the data, which were carefully transcribed into meaningful text, some interviews were returned to the field for member-checking. After confirming the interview transcripts from a few participants through the member checking process, the same was revisited repeatedly to become familiar with the data. After this, the coding process was completed, and the extracted codes from the data were subsequently used to generate themes in line with the empirical review. These themes were further discussed in the analysis section, drawing on empirical and theoretical reviews.

Analysis

When starting the analysis with the first question, how was your experience with research-based activities during online classes? The participants stated that there was not much ease in the course in the beginning. There was also a lack of understanding from the learners. One of the members stated that “these were quite challenging in the beginning, but then with the passage of time, students got familiar, and by the middle of the semester, we were all familiar, students and teachers”. 4 of the respondents were brave enough to declare that it was a pleasant and fun experience. One of the male teachers stated that while using the research-based approach, “students were more focused and had critical thinking”. He also stated that there was a “sudden shift from onsite to online courses,” but that the transition came with a wealth of conveniences for both teachers and students.

On another question, are research-based activities feasible, especially if they are group-based, during online classes? If yes/no, why? The participants described that research-based activities were feasible because they could explore different ways to provide supplemental materials, but admitted that students sometimes submit assignments past the deadlines. One of the faculty members mentioned that "they demanded more time than the usual credit hour time for the activities". Some faculty members attempted to clarify the necessity of research-based activities by emphasizing that "research-based activities are essential for completing group-based assignments, as group-based assignments are only feasible through research-based activities that integrate cooperative learning and scaffolding methods."

Do you think research-based activities affect students' interest in learning? Regarding the question, participants in master classes responded with a 'yes' and regarded the activities as related to their learning goals. One of the faculty members mentioned, "Yes, such activities motivate the learners. I believe they help students become more self-sufficient, as they require students to be more

active and engaged, and the activities were designed to capture students' interest more in online classes. 5 of the BS 1 students responded to question 3 with a 'no' because "they just copy and paste."

For another question, could you have a significant relationship with students in research-based online classes?" Most of the participants stated yes. "Yes, I had, but not with all." "Those with laptops or desktops experienced better productivity, while those limited to using smartphones encountered significant barriers in managing multiple pages for the same task." and "It would have been manageable, but the sudden implementation of the online system caught us unprepared." "Very little, if anything, was offered in the way of an orientation workshop, guidance, or proper instructions."

With regards to question no. 5, it can be safely assumed that research-based activities have brought all interviewees to the consensus that they 'can help students understand concepts' if 'chosen carefully'. "I believe they [the students] can. They [the research-based activities] have the participants doing the students' work actively, and instead of learning through what I may call breaking things up [into bits] and learning in an isolated manner. They [research-based activities] have students learning through a process of conceptualizing drills. They [research-based activities] devoid the learning process of what I call rote learning."

As for question no. 6, 'Where the research-based activities feasible to students' 7 of the interviewees to the students said it was and explained 'Yes, they were feasible mostly with laptops and desktops', while 3 interviewees said it was and explained 'when we set the goals, they completed the activities but we're not sure if they were and explained it was'. "It is complicated when the students' proficiency levels range, and in that regard, leveling up the ranges of the students' proficiency is what I would call scaffolding. What was the students' proficiency range? Many participants explained that the students lacked in that they 'knew it all was the minimal postulation of how to be informationally constituted'.

In question eight, the interviewees' answers on whether Concept map activities were useful were divided. Four interviewees mentioned that they were helpful because "Concept maps helped students brainstorm the ideas and organize them into various categories and then connect them." On the other hand, six members said students were not active participants in online classes. "They were not familiar with research courses, so they didn't know how to collect data and how to extract specific information."

For question nine, all interviewees said that a research-based study required autonomy, and they emphasized the importance of teacher involvement after the fact of such activities. "Yes, autonomy was okay, but they needed guidance quite frequently," said some of them. Some interviewees said students surpassed their expectations and were able to act on their own, while, on the other hand, acting as members of a group because of that autonomy.

For question ten, seven interviewees were in favor and said students became more creative during online classes and brought new findings to research-based study, providing new and interesting data and information that properly supported their research. "They usually came with valuable ideas and surprised the teacher. Such activities help teachers to identify the hidden potential of their learners," said the interviewees, and some were in disdain of that statement. Some of them said that, in that research, they never actually pushed themselves to be truly active participants and were simply happy with the activity process, but not the results. "Rarely did they come up with new things," said one interviewee. In question number eleven, concerning student access to a structured curriculum, seven of the interviewees responded 'no', and three interviewees said that respondents were provided with outlines and accompanying resources. "They were given the outline of the course in the first class, and the content of each class was given from time to time during their ongoing classes." Regarding another question concerning students' ability to generate a critical perspective whilst executing research-based activities, six of the interviewees said that students required a lot of support and guidance. "They mainly required the assistance of the teacher in order to understand the content, the nature of the activity, and the research methods to complete the task." Thus, most students lack the ability to think critically.

In question number thirteen, regarding the students, five interviewees said the students were provided with the requisite support to complete the research-based tasks. "I provided feedback during and after the class. This feedback was given during the activities and was descriptive rather than

prescriptive." However, five stated that students were 'somehow' supported to complete the task, but provided feedback post-activity: "not enough time, not enough support, not much guidance."

About the question, what was the change you found in students after research-based activities, they said "they became more engaged in a process of learning, they discovered the 'Academic world' of the Internet, they excitedly posted to each other about the activities. Research showed that they became more 'critical' by using the Internet and 'unfortunately, a lack of mechanism' to verify 'signaled the nature of influence' and research-based activities constructed learning activities, autonomy, and the Collaborative Learning approach." This last sentence was a bit of a run-on, and it indicated that, of the research-based activities, the precursor activities 'internet behavior' of the students was an important sign that research collaborative learning was of significant influence and participation.

Conclusion

Teachers' attitudes steeped in passion towards education, and students are invaluable. Each methodology and technique adopted by the teacher requires the utmost grip and dedicated commitment to succeed and be productive. A sufficiency of guidance and facilitation motivates the students and propels them to new horizons. A research-based approach empowers students to engage in activities of exploration, independent investigation, and research. It fosters distinctiveness of thought and an ability to make autonomous and informed decisions. A determined research-based approach encourages students to go beyond borders to delve deeper into the unknown, and teaching and learning are opportune and beneficial when conducted through online platforms during the pandemic. A research-based assignment would be simple and more gratifying if undertaken within the confines of an instructive task. New and fresh thoughts, new ideas, and the novelty of thought. The inquiries of a research-based approach sponsor a scientific approach to the environment. It is further supported by the semi-structured interviews, which indicate that developing, testing, and reflecting on plans is essential to creating a research-based, effective teaching and learning process in online classes. This research concluded that a research-based teaching approach is highly effective. This approach can achieve optimal results by actively engaging students under dedicated guidance and teacher facilitation in online classes. It needs a structured curriculum, strong collaboration between teachers and students at every step, and students' autonomy. Online learning is a boon to explore past literature. Students can explore worldwide challenges and initiatives to address the problem in online classes through a research-based approach.

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