Exploring Teachers' Experiences with Technology-Integrated Flipped Learning: A Qualitative Case Study from Gilgit-Baltistan and Chitral

Noor Shamsuddin[1*], Abdul Wali Khan[2]

[1] Nazarbayev University, Republic of Kazakhstan
[2] Lingnan University Hong Kong, China
noorshams.uddin@nu.edu.kz

ABSTRACT

During the COVID-19 pandemic, schools in Pakistan faced prolonged closures over various phases, leading educational institutions to seek alternative methods to ensure students' continued learning. Embracing technology as a viable solution, private schools started digital learning programs (DLP) by creating digital resources distributed to students for home viewing. In the post-COVID-19 scenario, teachers changed traditional classrooms into flipped learning using the already prepared video materials. This technology-integrated flipped classroom was a new experience for teachers in the rural mountainous region of northern Pakistan. This paper highlights the perceptions and experiences of 20 purposefully selected teachers from Gilgit-Baltistan and Chitral (GBC), Pakistan. The teachers were selected based on their active involvement in developing digital learning materials and their utilization to transition from traditional to flipped classrooms in various private schools. By focusing on these specific regions, the study provides valuable local insights into the (un)successful integration of technology in teaching and learning practices in rural settings. The findings of this study can serve as a valuable resource for teachers, school leaders, and policymakers, facilitating a deeper understanding of the impact and potential of technology-integrated flipped classrooms in the post-COVID-19 educational landscape of GBC. Moreover, by investigating the local context, this research bridges the gap between theoretical concepts of technology integration and the practical realities faced by teachers and students in Northern Pakistan. This study provides evidence-based recommendations and strategies for future initiatives to enhance teaching and learning practices through technology-integrated flipped classrooms.

Keywords: Technology Integration, Flipped Classrooms, Teachers' Perceptions, Rural Schools, GBC

1. Background for the Study

The emergence of COVID-19 led to unprecedented disruptions in education worldwide, compelling institutions to adopt digital and remote learning methods (Buonsenso et al., 2021; Tarkar, 2020). In the rural and mountainous regions of Gilgit-Baltistan and Chitral (GBC), where technological infrastructure faces significant limitations, private schools tailored online teaching by introducing Digital Learning Programs (DLP). These programs aimed to ensure continuity in education despite prolonged school closures caused by the pandemic and the impossibility of online teaching due to severe internet connectivity. Given the technological challenges in these areas, schools creatively leveraged technology to bridge the gap. Teachers and school administrators recorded lectures and developed video content tailored to their curriculum. They also adapted, edited, and merged freely available digital resources from various platforms to create coherent and accessible instructional materials. These resources

were distributed to students offline or through platforms requiring minimal bandwidth, allowing education to persist even in remote and underserved areas.

Post-pandemic, the digital materials developed during this period remained an asset for schools and educators. Some teachers began integrating these resources into classroom practices, mainly through flipped learning models. In a flipped classroom, students engage with instructional content (such as videos or readings) at home and dedicate in-class time to interactive, application-based learning (Xiu & Thompson, 2020; Giannakos et al., 2014). This model significantly shifts from traditional teaching methods, emphasizing student-centered learning and active participation.

Despite the challenges of limited resources and connectivity, adopting such innovative strategies in rural mountainous Pakistan demonstrates the resilience and ingenuity of educators in adapting to global educational trends. The transition addressed immediate needs during the pandemic and laid the groundwork for integrating technology into long-term pedagogical practices, highlighting the potential for digital tools to transform education in resource-constrained settings. However, in the face of rural context -community beliefs about schooling, and school leaders' understanding of traditional teaching where the teacher is always a giver and the students are the recipient- these initiatives were not without challenges. In a rural context where informed flipped classrooms had never been practiced, this study aimed to explore teachers' perspectives on technology-integrated flipped classrooms.

1.1 Understanding Flipped Classroom

Recent research has focused on the value of flipped classrooms in promoting active learning among students. This valuable approach provides a flexible, synchronous learning experience where students can access teaching resources and lectures online, leaving class time for interactive discussions and activities (Xiu & Thompson, 2020; Giannakos et al., 2014). As Tucker (2012) notes, flipped classrooms are adaptable, with no single fixed model. The concept involves "flipping" the traditional classroom setup so that students review learning materials before class, allowing them to learn at their own pace and build foundational knowledge (Bergmann & Sams, 2012). This preparation enables students to engage actively with peers and teachers during class, deepening their understanding and addressing misunderstandings (Lo, 2017).

Flipped classrooms often incorporate collaborative, problem-based, peer, and inquiry-based learning. Formally introduced in 2012 by chemistry teachers in the United States, educators quickly adopted this model. The flipped classroom approach fosters deeper, active learning by delivering direct instruction before class and maximizing classroom time for student-centered activities (Hamdan et al., 2013).

Studies generally show positive views on flipped classrooms (Lo & Hew, 2017; Xiu & Thompson, 2012). Xiu and Thompson (2020) conducted a study in the U.S. on how flipped classrooms affect student motivation. They found that while the flipped classroom is an innovative strategy, whether student motivation in a flipped class differs from that in traditional or fully online courses remains to be determined. Participants in their study expressed positive attitudes toward the flipped classroom. Similarly, Sturek and Basile (2013) found that students in flipped classrooms could learn content at their own pace, which helped them better understand the material. Like Prince (2004), other studies associate flipped classrooms with active learning, which occurs when students fully engage with materials. According to this study, active learning involves students actively processing knowledge by connecting new information with prior knowledge rather than passively listening to lectures and taking notes.

2

Roach (2014) also reports that students had positive learning experiences in flipped classrooms, achieving high test scores. Overall, most students show positive attitudes toward flipped learning, with improved academic performance and greater course satisfaction compared to traditional classrooms (Zhonggen & Wang, 2016). However, some students in flipped classrooms still prefer the conventional model (Johnson, 2013; Missildine et al., 2013). Studies suggest that students who favor traditional classrooms often view flipped learning as time-consuming, burdensome, and requiring more self-directed learning (Lo & Hew, 2017; Tune et al., 2013; Xiu et al., 2019).

Though introducing flipped classrooms with technology integration was a newer practice in the mountainous region, this pedagogical model is widely and significantly practiced worldwide in schools and higher education levels (Walker et al., 2020). Providing digital materials to review outside of class enables teachers to have more interactive courses, generate positive discussions, and transform passive learning environments into more active and engaged learning experiences (Baepler et al., 2014). Studies have revealed that flipped classrooms can potentially enhance student learning outcomes (Summer & Gosselin, 2013), providing students with hands-on practices to contribute to the class, which is unlikely in the traditional classroom (Strayer, 2012). The national curriculum of Pakistan also places ample emphasis on the integration of technology into the classroom to enrich students' learning. Efforts are underway to materialize this promise, which is yet to come. Given the backdrop, this paper explored teachers' perceptions of technology integration in the flipped classroom setting, focusing on their experiences, challenges, and associated benefits. These teachers have been involved in developing and using digital course content for teaching. Therefore, studying their experiences of the new way of teaching involving technology was an exciting topic to explore.

1.2 Historical Evolution of Flipped Classrooms

The flipped classroom model was first popularized by Jonathan Bergmann and Aaron Sams in the late 2000s as a response to the growing need for active, student-centered learning environments (Bergmann & Sams, 2012). Their initial implementation involved using recorded video lectures to move direct instruction outside of the classroom, allowing for more interactive, problem-solving-based activities during class. The concept quickly gained traction with the proliferation of digital tools like YouTube, Edmodo, and Learning Management Systems (LMS). Over the past two decades, flipped learning has expanded globally, with applications in higher education, K-12, and professional training. Research has demonstrated its efficacy in enhancing learner autonomy and engagement (Lo & Hew, 2017). Despite its widespread adoption, the success of flipped learning varies depending on factors such as institutional support, access to technology, and teacher training.

1.3 Technology Integration in Rural Education

Rural education systems often need more access to infrastructure, internet connectivity, and trained personnel, which can hinder technology adoption (Bon et al., 2024). However, integrating mobile technology and offline digital resources, such as pre-loaded content and interactive devices, has shown promise in bridging these gaps (Mays & Cheng, 2024). Teacher training in digital pedagogy is another critical factor in successful implementation. In the context of flipped classrooms, asynchronous tools such as videos, downloadable materials, and mobile apps have provided rural students with opportunities to access high-quality instruction outside of class. Furthermore, community-based approaches and partnerships with non-profits and governments have been pivotal in sustaining these efforts (Borthwick & Hansen, 2017).

1.4 Student and Teacher Engagement

Flipped classrooms significantly enhance both student and teacher engagement. By shifting lecture-based content delivery outside of class, this model gives students more excellent agency in their learning process (Gondal et al., 2024; Xu et al., 2021). Research shows that students in flipped classrooms demonstrate higher participation, collaboration, and critical thinking levels than in traditional lecture settings (Zainuddin & Halili, 2016). For teachers, transitioning to a flipped model allows for more interactive and personalized in-class sessions, facilitating a deeper understanding of student needs. Additionally, the collaborative nature of flipped learning has been linked to increased job satisfaction among educators, as it reduces the monotony of traditional teaching methods and fosters a more dynamic learning environment (Bishop & Verleger, 2013).

During the COVID-19 pandemic, students in Pakistan relied heavily on home-based and online teaching to continue their studies (Ng & Renshaw, 2020). Distance learning, or learning from home, enables flexible learning options, including home study, online resources, study packs, and assignments. This paper examines how rural private school teachers in Pakistan adapted their teaching approaches after COVID-19 school closures. We draw on Engeström's third-generation activity theory, which sees pedagogy not just as teaching skills but as a structured process involving rules, interactions, and tools that guide teaching to achieve valuable outcomes (Engeström, 1987, 2001, 2007, as cited in Ng & Renshaw, 2020, p. 5). In the context of flipped classrooms, we also discuss experiential learning.

2. Theoretical Framework

We integrate three complementary models' Activity Theory, Kolb's Experiential Learning Framework, and De Bono's Six Thinking Hats, to develop a robust theoretical framework for understanding and analyzing flipped classrooms in rural, resource-constrained contexts like Gilgit-Baltistan and Chitral. Together, these models provide a multidimensional perspective on the opportunities and challenges of flipped learning in rural classrooms.

2.1 Activity Theory: A Systemic Lens

Activity Theory, developed by Vygotsky and expanded by Engestrom (2001), examines the mediated nature of teaching and learning through four key components: tools, rules, community, and division of labor. This theory offers a systemic lens for analyzing the socio-cultural and structural factors that influence the adoption of flipped classrooms.

Tools: include digital videos, interactive platforms, and asynchronous communication tools mediating learning. For example, in this study, the WhatsApp group is a tool that allows teachers to discuss issues and come to school more prepared.

Rules: The rules are systemic norms and policies, such as parental resistance or traditional expectations from school leadership, that shape the implementation of flipped classrooms.

Community: This includes parental perceptions and societal norms, which play a significant role in students' educational development.

Division of Labor: Flipped classrooms reframe the teacher's role from a knowledge dispenser to a facilitator, aligning with the collaborative goals of modern pedagogy. The teachers of this study acted as facilitators of knowledge by uploading the videos or providing the students with USBs and other forms of electronic devices for lecture hearing at home.

2.2 Experiential Learning: Iterative and Reflective Teaching

Kolb's Experiential Learning Framework (1984) highlights the iterative cycle of learning through four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. This framework complements Activity Theory by emphasizing how teachers and students adapt and refine their practices based on lived experiences. Further details of the framework are below.

Concrete Experience. In this part, the teachers create and use digital content during the pandemic, which serves as the foundation for flipped learning, e.g. sometimes it is fun learning new things when everything are disturbed by COVID-19. Reflective Observation (RO): In RO teachers reflect on classroom outcomes and student feedback, such as critiques of video quality, which inform future improvements. Students may learn from social media such as Tiktok etc.

Abstract Conceptualization. Feedback loops enable teachers to conceptualize and design improved strategies for flipped classrooms, such as adapting content to better suit student needs.

Active Experimentation. In this part, refined strategies are implemented to address specific challenges.

2.3 De Bono's Six Thinking Hats

This approach helps evaluate Multidimensional Perspectives. In this study, this model provides a structured approach to assessing the flipped classroom model from multiple perspectives in GBC.

White Hat (Information). This hat emphasizes factual data and evidence supporting flipped classrooms. Studies by Bhagat et al. (2016) and DeLozier and Rhodes (2016) demonstrate their effectiveness in improving learning outcomes.

Red Hat (Feelings). This hat highlights the emotional aspects, such as increased student engagement and satisfaction. For example, Gilboy et al. (2015) found that flipped classrooms enhance motivation.

Black Hat (Challenges). It identifies barriers such as parental resistance and operational difficulties. Betihavas et al. (2016) noted challenges in adopting flipped learning in specific contexts, such as nursing education.

Yellow Hat (Constructive). This hat focuses on designing effective strategies. Kim et al. (2014) proposed principles to create structured and engaging flipped learning environments.

Green Hat (Creative). This hat explores innovative uses of flipped classrooms, such as Engin's (2014) student-created videos and Wang's (2016) mobile-assisted systems.

Blue Hat (Thinking about Thought). This hat encourages a meta-cognitive analysis of flipped classrooms. Bishop and Verleger (2013) suggest problem-based learning methods to enhance pedagogical effectiveness.

2.4 Integrated Framework for Flipped Classrooms

Integrating these models provides a comprehensive framework for understanding flipped classrooms in the rural contexts of Gilgit-Baltistan and Chitral. For instance, Systematic Analysis or Activity Theory examines the socio-cultural and institutional factors shaping the implementation of flipped learning in rural contexts. Similarly, reflective practice or experiential learning emphasizes iterative teaching and continuous improvement through

student and stakeholder feedback. Similarly, Multifaceted Evaluation or Six Thinking Hats, offers a structured approach to assess opportunities, challenges, and innovations related to flipped learning in the GBC. In so doing, this theoretical framework addresses the complexities of implementing flipped classrooms and provides actionable insights for overcoming barriers and enhancing teaching practices in resource-constrained settings. The framework looks like as below:
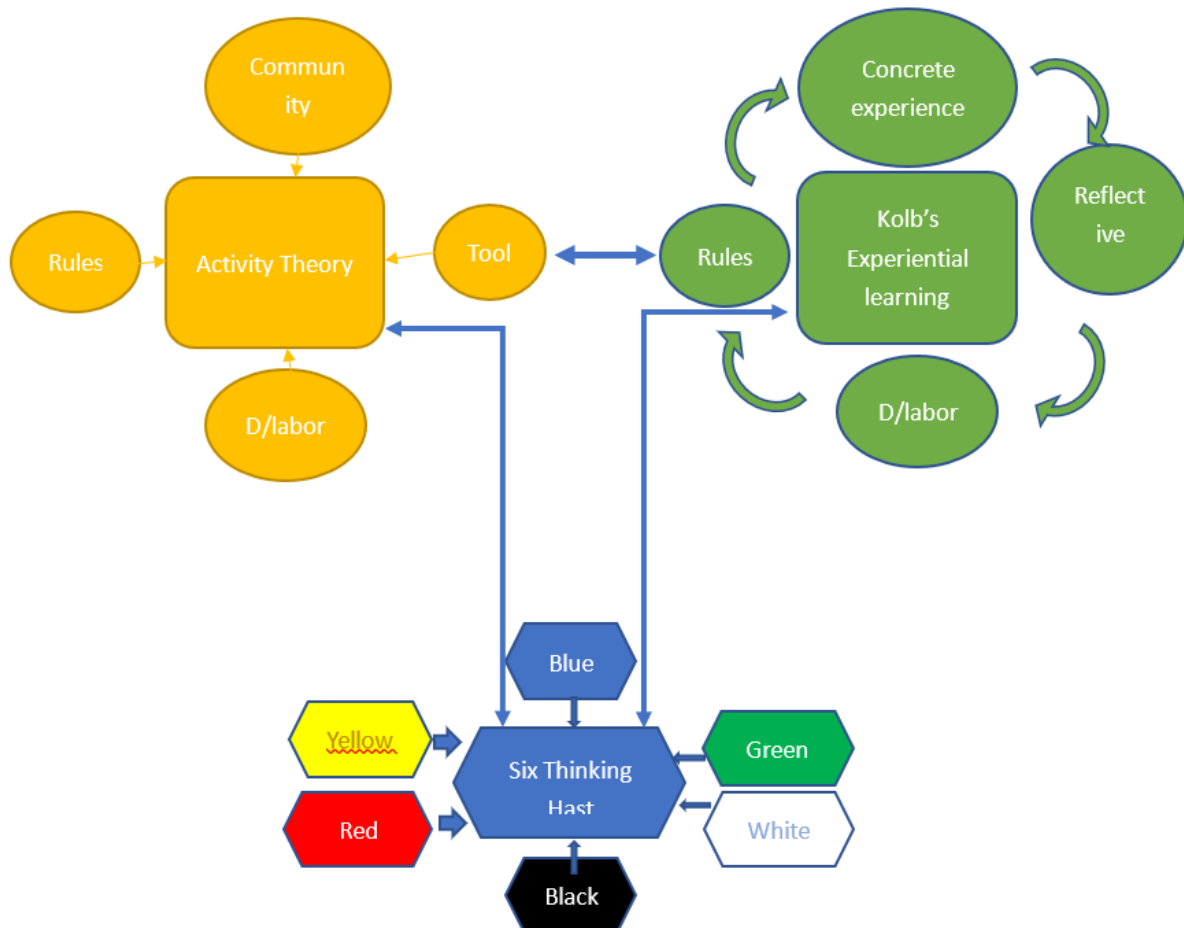

Figure 1. Theoretical framwork

3. Research Design and Procedure

Our theoretical understanding of the flipped classroom and previous literature guided us to frame our research questions. We aimed to explore the following question: What are rural teachers' perceptions of developing digital content followed by technology integration in the flipped classroom in Pakistan? Additionally, we were interested in understanding i) What benefits do teachers perceive from using technology in the flipped classroom? ii) What challenges do teachers face when integrating technology in the flipped classroom, and how do they overcome them?

This study used a qualitative research approach guided by the researchers' beliefs of reality as socially constructed (Creswell, 2013). Moreover, exploring teachers' conceptualization of technology integration in flipped classrooms required multiple and varied perspectives. This further necessitated qualitative approach, which allowed us to select our research participants and conduct detailed interactions purposively (Merriam, 2014; Glesne, 2011).

In the qualitative approach, we used a case study design. Since the purpose of this study was to explore the unique and diverse perspectives of teachers regarding flipped learning. To achieve this, we employed a case study design, which is particularly effective in capturing the complexity of real-life educational practices (Yin, 2018). Specifically, this single case study focused on flipped learning in the rural and mountainous regions of Gilgit-Baltistan and Chitral (GBC). The study aimed to investigate how teachers perceived and experienced flipped learning in the new normal educational context following the disruptions caused by the COVID-19 pandemic. In this design, the schools were not treated as separate cases but were instead considered as part of the broader context for exploring teachers' perceptions and experiences.

The participants for this study were purposefully selected based on specific criteria (Merriam, 2014). A total of 20 teachers were interviewed using a semi-structured interview protocol, which allowed for consistency in questioning and the flexibility to go deeper into individual perspectives, a unique feature of the qualitative approach (Merriam, 2014). The selection criteria focused on teachers who had been directly involved in the Digital Learning Program during the school closures caused by the COVID-19 crisis. These participants were responsible for developing digital learning materials to support students during remote learning. Additionally, these teachers were chosen because they later utilized these same digital resources in their classrooms, transitioning them from traditional to flipped classrooms when schools reopened under the new normal conditions.

This dual role—both as creators of digital content during the pandemic and as implementers of the same content in post-pandemic classrooms—ensured that the selected teachers had extensive, practical experience with flipped learning. Their participation offered rich and multifaceted insights into the challenges, opportunities, and outcomes of implementing flipped learning in resource-constrained, rural contexts, validating our criteria of selecting who knows the most criteria (Merriam, 2014).

Before conducting the interviews, the participating teachers were informed about the anonymity and confidentiality of their data, ensuring their voluntary participation in the study (Merriam & Tisdell, 2015). After obtaining informed consent, the interviews were recorded to capture the participants' perspectives accurately. These recordings were later transcribed to prepare the data for further analysis.

The data were analyzed using Braun and Clarke's (2006) thematic analysis framework, which involves a systematic and iterative approach to identifying patterns and themes. The analysis process began with familiarization with the data through repeated readings of the transcripts. Next, the data were coded using a color-coding mechanism in Microsoft Word to systematically organize key concepts and insights. These codes were then grouped into categories, which formed the basis for identifying broader themes.

As thematic analysis is an inherently iterative and reflective process, we engaged in a back-and-forth refinement of the themes to ensure they accurately captured the essence of the data. This iterative process allowed us to thoroughly examine, refine, and consolidate the themes, ultimately leading to the generation of our findings.

4. Key Findings

This section presents the study's findings, organized around key themes from the data. These themes capture teachers' core insights and experiences, offering a detailed understanding of the subject under investigation, supported by direct evidence from the data, to highlight the

participants' perspectives and experiences. The table below visually presents the findings in this section's themes and subthemes.

Table 1. Findings of this section's themes and subthemes

Key themes	Sub-themes
Positive Experiences with Digital Content Development and Flipped Classrooms	New learning and enhancing technical know-how.
	Students' motivation and active participation.
	Focus on individual differences and positive outcomes.
Opportunities and Challenges of Integrating Technology in Flipped Classrooms	Taking Flipped for granted.
	Less cooperation by school leadership and parents.
	Socio-economic conditions of school community.
	Innovation in overcoming challenges.

4.1 Positive Experiences with Digital Content Development and Flipped Classrooms

Our analysis indicates that participants had a positive experience engaging with digital content development and flipped classrooms. They believe technology-integrated flipped classrooms promote new learning by enabling teachers' technological know-how, motivating students to participate actively, making the teaching-learning process exciting, and making results productive by ensuring teachers focus on the student's progress.

New learning and enhancing technical know-how. Of the 20 research participants, 13 believed that flipped classrooms provided new knowledge for students and teachers. Milkhoon, who served in the schools for a decade in Gilgit-Baltistan (GB), stated that she was always a traditional pedagogue despite the availability of resources for an ICT-integrated classroom. She said that the flipped classroom phenomenon was new to her. She elaborated on her viewpoint,

> I did not know what was flipping the learning. I just asked students to watch the video and come prepared for the discussion for my ease. Luckily or unluckily, my vice principal visited the class, and she was happy with the active participation of the students. In the end, she said, a lovely, flipped classroom, which triggered me to Google flipped learning, and thus, I made it a part of teaching (Milkhoon, GB).

Like Milkhoon, many other teachers believed that developing digital content, disseminating it, and getting feedback from experts in the field enhanced their technological know-how. Gulab Khan, a newly inducted teacher from Chitral, was excited while sharing that he was allowed to be in the team of digital content creators despite being a freshly inducted teacher. He excitedly shared, "I have never used my mobile device or computer for video editing. It was fun learning new things when everything was disturbed by Covid". Likewise, for some teachers, working on digital content creation and later using it in the classroom was an opportunity to get student feedback. Most of the research participant teachers highlighted that their students, being a generation of modern times, are far better at using technology than the people of their teachers' age. Gulbadan, a seasoned teacher with 14 years of teaching experience, happily shared that in the new-normal school, her students approached her to show some of their technical skills. "Let me tell you, every time a student approached me and guided me to make my videos eye-catching.," She added, "We developed videos in a crisis. We were teased, and the future was bleak. However, with the introduction of flipped classrooms, the students started talking about the quality of videos". The observations of Bulbul from GB, who was previously a primary school head for 5 years and now teaching in a secondary school for 6 years, were like those of

Gulbadan from Chitral. He said, "They were happy with the content but not with the technical aspects of those videos made by their teachers during school closure." Based on the feedback from the students, the teachers tried to improve their teaching, as Bulbul Baig articulated:

> It was helpful for me as well. I received feedback from students about my lecture videos. It helps me experience new learning. Although the organization initially trained us on digital content creation, I learned more from some of my *TikToker* (students). Flipping was a two-way learning for me (Bulbul Baig from GB).

Students' motivation and active participation. The participants demonstrated that flipped classrooms motivated students and actively participated by watching videos and sharing their knowledge, fostering active learning instead of passively receiving information through traditional lectures. Jannat Gul from GB expressed that the transition from a conventional to a technology-integrated flipped classroom resulted in more motivation and active participation by the students. She explained, "Students were less interested in lecture-based teaching as compared to the flipped classroom where a positive behavior is observed on the part of the student." Shokor Khan, from Chitral, who had rich experience teaching private schools in Chitral, expressed similar views. He demonstrated:

> In the informal gathering, they always say, "*Bore Kosan la Ostaz*" (Your classes are boring), but they never used this phrase when I started flipping my classroom. Now, I provide them with video recordings, and we have a WhatsApp group. They bring issues there and thus come to school more prepared. Everyone participates and enjoys. They are no longer bored (Shokor Khan from Chitral).

In agreement with Shokor Khan, a teacher named Purdom Khan from GB highlighted that traditional teaching methods are used because there are more students, fewer technological facilities, and less classroom space. "For us, lecturing was the only way of teaching," Said Purdom Khan. Elaborating on his viewpoint, he claimed COVID-19 as a blessing for the transition from lecture to a more student-centered classroom in the form of flipped learning the following words.

> Covid was a blessing in disguise for us. As I said, I love ICT-integrated teaching but couldn't do it because of a lack of facilities. Due to Covid-19, our school has provided all the resources. We created videos and shared them. We had multimedia, speakers, LEDs, and more when schools opened. I now use these resources to flip my classrooms. You can't imagine how interesting my classes have become for my students. We (my students and I) are both happy with the new system (Purdoom Khan from GB).

Focus on individual differences and positive outcomes. The study also found that teachers needed more interaction with students due to traditional classrooms. They need more time to focus on slow learners under the pressure of course completion and answerability to school management. One of the teachers, Qalahor Bibi from Chitral, believed that she needed more time to focus on individual students despite his wish to do so because of the number of students and fewer teachers. She, however, believes that her experience of flipping classrooms gives teachers' perceptions of developing digital content followed by technology integration in the flipped classroom, giving them an edge to focus on individual differences and promote high-order thinking in the school. She asserts that in a flipped classroom scenario, the teachers are proactive, concentrate on all the students, and give time for slow learners as she narrated:

> I did not know that some students are fragile when lecturing. I learned that some

students were technically marginalized when I started conducting group discussions, individual presentations, and activities. Due to flipping, I now have more time to focus on those students, and their performance is visibly better than the previous one (Qalahor Bibi from Chitral).

It is pertinent to present that most teachers mentioned during interviews that inclusive Classrooms in their region face the significant challenge of addressing students' individual needs. "You see; we have all types of students. Some love storytelling, some enjoy watching videos, and some prefer to work alone," shared Jafaryat, GB's most senior participant teacher. She added that as a mother of six children, she understands how one child can differ from another, but their individuality is often overlooked during the one-size-fits-all lecture-based methods used in schools. Jamiat Khan from Chitral expressed a similar sentiment in the following words.

> I have completed my master's degree in behavioral psychology. I understand that every student needs specific attention, which we cannot provide during a 40-minute classroom teaching session. However, the flipped classroom model has allowed me to focus on individual students. I know my students better now, and they sense it. They become more motivated and relaxed as they realize I respect their unique learning styles and become more motivated and comfortable. Trust me, the flipped classroom has made my students' lives easier (Jamiat Khan from Chitral).

4.2   Opportunities and Challenges of Integrating Technology in Flipped Classrooms

Flipped classrooms were praised for providing alternative interactive learning methods, enabling students to contribute mature ideas and increasing their interest and motivation. However, this study also found that integrating technology into teaching presented challenges.

Taking Flipped for granted. The participants believed that some students should have watched lectures at home, resulting in limited participation in class. Six out of 20 research participants had similar experiences. Margast, one of the leading members of DLP from Chitral, claims to be an expert in digital content creation but wanted to be happier with the student's response to her innovation of flipped learning. She sorrowfully exclaimed, "You see, we provide videos, and the next day, some of the students come to school without watching a single minute. I don't know how to have checks and balances in this situation." However, Jamiat Khan, a teacher with additional responsibility for student counseling service from a neighboring school in the same region, sees the situation through his human psychology lens. He explained the problem in the following words.

> As I said earlier, it is a game of individual differences. Only a few students are less interested in watching videos. In my class, some students come without watching the given videos. The solution is to make videos more engaging. The same students watch funny videos on YouTube… may or may not…I will say things will change, and one day, they will also respond to flipped learning (Jamiat Khan from Chitral).

Another teacher, Shokor Khan, who was happier that he made his classes enjoyable by flipping, is less convinced about this situation. He claimed that despite his every struggle, a few students take flipped classrooms for granted and never watch videos. They came to class without preparation, and when asked to participate in the discussion, they remained silent— "a death silence." Shokor Khan added with grief, "I have even had meetings with their parents. Most of

the class is happy with flipped learning, and I see positive outcomes. I don't know how to convince these a few to watch videos at home."

Less cooperation by school leaders and parents. Apart from a few students' lack of cooperation, some participants see parents and school leadership as hindrances to making flipped classrooms an effective practice in their context. The study found that certain principals needed to be more cooperative, claiming that this pedagogy consumes more time and creates unwanted noise in the name of class and group discussion. Moreover, the participants also faced challenges on the part of parents; some parents expressed concerns about excessive mobile use for social media and gaming when they were given a gadget for viewing digital content provided by the teacher.

A relatively young teacher, Barzangi, with a master's degree in education and three years of experience in secondary school teaching from Chitral, shared on a lighter note, "School heads need to be catalysts for change, but our one is a hindrance to innovation." He added, "Actually, it is a serious matter, and we need to consider it. The organization needs to convince management to accept change before initiating it". In line with Barzangi, Raja Khan, a pioneer member of the DLP team and a seasoned teacher from GB, also expressed similar views. He narrated

> I can manage connectivity instead; my students can do it, but I cannot control their parents and principals. These people believe that technology ruins children, which is not valid. Parents are not cooperating. One parent approached the principal and said my children were watching English movies. Now, how can we tell them that listening is part of learning? (Raja Khan from GB).

A few teachers from Chitral have shared similar experiences. For instance, Angaar Khan claims that every month, any parent complains against him to the principal that students are demanding laptops to watch recordings provided by him. They argue that buying a computer for a 10th grader is unsafe as exposure to the virtual world will ruin their children. "They all have smartphones, and they are already global citizens. How these parents want to control technology," said Angaar Khan surprisedly. Likewise, Rajoli from the same region narrated that her principal was initially unhappy with the flipped classroom. "She now understands the advantages of this model and is insisting that others follow," claimed Rajoli, a young and energetic teacher from Chitral.

Socioeconomic conditions of the school community. The study also found that socioeconomic conditions matter significantly for a successful technology-integrated flipped classroom in an area. Like Dada Khan from GB, most participants expressed that flipping is a finance-oriented project. While discussing less cooperation from the community, Milkhoon claimed that parents' socioeconomic conditions and lack of awareness about positive technology usage are challenging to make the flipped classroom a regular practice in the rural context. She said, "Poor parents either cannot buy gadgets or are pessimistic about technology; they believe smartphones ruin their children's lives. We must train the parents and the students first. However, Jamiat Khan disagrees with Milkoon regarding the parents' economic conditions; he views it as a social phenomenon. The following excerpt from his interview shows his viewpoint.

> Every household has at least one smartphone, laptop, and television. We provide videos on USBs, allowing them to watch these on their television screens. This isn't a financial issue but rather a social problem. Parents believe that technology destroys youth. Our parents must understand that learning occurs through technology, and

they cannot keep their children limited to textbooks. Gadgets are helpful tools, not distractions (Jamiat Khan from Chitral).

Unlike Jamiat Khan, Shokor Khan also sees parents' financial conditions as one reason for the difficulty of smoothly implementing flipped learning. He said, "Our society is inferior. They hardly pay school fees and can manage their children's smartphones or laptops. Jafaryat from GB expressed the same views, saying it is tough to buy a mobile for her six children. "We both (my husband and I) are earning but still cannot manage. How can I expect other people who labor to meet both ends?" added Jafaryat.

Purdoom Khan believed that, despite its positive aspects, flipped learning is challenging in rural contexts primarily because of the parents' economic conditions. He said,

> "On one hand, the flipped classroom was a source of active and efficient learning, and teachers and students appreciated it. On the other hand, it created a challenge for parents who had financial difficulties and could not provide gadgets for their children (Purdoom Khan from GB).

Innovation in overcoming challenges. This study found that rural teachers view the flipped classroom as a positive initiative toward student motivation and active participation. They also recognize some challenges in implementing this model. However, some of the teachers believe that these challenges can be overcome with some innovative techniques. For Instance, Margast, a young Chitrali teacher with two years of teaching experience, keeps pursuing the challenges. She believes that innovation is never an easy task but comes with challenges. "The issues around flipped learning can be handled by teachers if they have the will to do so," said Margast with conviction. Another teacher, Dada Khan, who was talking about parents' financial compulsion and complaints about excessive use of gadgets if provided, said that he had found a solution for that as well. The following excerpt from his interview shows how he dealt with this situation,

> Some parents are impoverished, and some can only afford a smartphone. Five of my grade 10 students do not have mobiles. I convinced their elder brothers and sisters to give the students their smartphones or laptops for two hours every evening. They are doing what they are helping; financially, we are more inclined to learn. This is how I manage my classes. It is hectic if you have no device and weak connectivity, but you can if you have one (Dada Khan, from GB).

The study also found that apart from the parents, in some cases, school leaders did not support innovations. As presented in the previous section, many participants believed that flipped classrooms become challenging due to a lack of cooperation or a weak understanding of the situation by the school leadership. For instance, Qalahor Bibi from Chitral faced an issue with her school leaders. During the interview, she exclaimed, "How can my principal be that arrogant? She once argued with me, saying that your class was disorganized. She wanted them to sit in the traditional style while I reshaped the classroom chairs and desk to facilitate group work". Qalahor believes that school leaders resist change only because they lack an understanding of flipped classrooms and other modern pedagogies. The following excerpt from his interview gives a broader picture of the scenario.

> My principal has always been unhappy with my idea of a flipped classroom. I tried to convince him, but he was rigid about his teaching philosophies. We have agreed to end this next year. However, I am sure my students will get good marks because of flipping the classroom, which will give me the base to continue and convince my

> principal. To be honest, I do not want to switch back to my old teaching style (Qalahor from Chitral).

Regarding school leadership's role in technology-integrated flipped classrooms, Raja Khan has had a similar experience to that of Qalahor. "My principal is very traditional and believes I must always give lectures. Once, he asked,' If they were doing everything by watching the video, what would the use of a teacher be?'" Raja Khan says he did not lose heart; instead, he tried to educate the principal about flipped classrooms. The following excerpt from his interviews tells his story of using an innovative way to continue his chosen flipped learning model.

> Flipped classrooms are beneficial for my students. I was supposed to revert to lecturing or persuade my principal to accept this new model. I started sharing short videos on flipped learning in our school WhatsApp group. The principal watched these. After a week, I approached her and asked her to regularly observe my class for a week before jumping to a conclusion. She agreed, and I made my classes more interactive. Three days later, she publicly acknowledged that Mr. Khan was doing well. We should not be egoistic in bringing about positive change (Raja Khan, from GB).

To sum up, this study presented flipped learning as a source of positive interaction in the classroom, advancing technological skills and allowing time for teachers to focus on individual differences. However, in rural contexts, this model is not without challenges, as traditional approaches to teaching and learning are part of the conventional beliefs held by school leaders, parents, and students. This study also shows that despite these challenges, some teachers are adopting this model and implementing innovations to overcome the obstacles.

5. Discussion

The findings of this study reveal a significant alignment with existing literature on the benefits and challenges of implementing flipped classrooms. Participants expressed overwhelmingly positive responses, especially regarding the use of technology for digital content development, which was highlighted as a time-saving and engaging approach to learning. This resonates with studies by Gilboy et al. (2015) and Gross et al. (2015), which emphasize the role of flipped classrooms in fostering active learning environments. Integrating technology-enhanced interactivity reduced the monotony of traditional lecture-based teaching, as evidenced by Shokor Khan's observation of heightened student enthusiasm and engagement. These findings support Gilboy et al. (2015) and Zhonggen & Wang (2016), who identified increased student motivation and satisfaction as core benefits of flipped learning.

A novel insight from this study is the evolving perception of flipped classrooms among teachers. For educators like Milkoon, initially unfamiliar with the approach, the positive impact on student engagement validated its effectiveness and encouraged its formal adoption. This mirrors the findings by Bishop and Verleger (2013), who argue that flipped classrooms foster pedagogical innovation and adaptability. Furthermore, participants like Bulbul Baig highlighted the reciprocal nature of flipped learning, wherein teacher-student feedback loops enabled continuous improvement of teaching practices. This aspect aligns with experiential learning theories (Dewey, 1910; King & Kitchener, 2004), which underscore the co-creation of knowledge through reflective practices. The adaptability of flipped classrooms also allowed teachers to provide individualized attention to students. For instance, Purdom Khan reported an enhanced ability to focus on students who might otherwise be overlooked in traditional

13

lecture formats. This finding aligns with research by Prince (2004) and Abeysekera and Dawson (2015), who advocate for flipped classrooms' student-centered and reflective nature to tailor educational experiences to individual needs.

However, the study highlighted significant challenges in implementing flipped classrooms, particularly in resource-constrained rural contexts. Resistance from parents and principals, as well as concerns over increased screen time, were common barriers. This aligns with Betihavas et al. (2016) and Pierce and Fox (2012), who identified stakeholder acceptance as crucial for successfully adopting flipped learning methods. Financial constraints further compounded these challenges, as illustrated by Dada Khan's efforts to convince families to share devices. This finding is consistent with studies by Tune et al. (2013), Lo and Hew (2017) highlighting the socioeconomic disparities impacting access to digital learning. The insights from this study are further supported by Kolb's experiential learning framework, which emphasizes reflection and feedback as critical elements in refining teaching practices. Teachers' adaptive strategies, such as modifying lesson plans based on student feedback, illustrate the practical application of experiential learning in classroom settings. Additionally, activity theory provides a lens to understand educators' systemic challenges, such as stakeholder resistance and resource limitations. Addressing these challenges required innovative solutions and community engagement, aligning with the findings of Pierce and Fox (2012) on the importance of stakeholder support.

This study's findings resonate strongly with Kolb's experiential learning framework, which emphasizes the role of reflection and feedback in improving teaching practices. Teachers' adaptive strategies, such as modifying lesson plans based on student feedback, illustrate how experiential learning unfolds in real-world classrooms. Activity theory also illuminates teachers' systemic challenges, such as resistance from parents or school administrators. Teachers demonstrate resilience and innovation by addressing these "rules" and leveraging community resources. These insights align with Pierce and Fox (2012), who noted that stakeholder support is critical for successful flipped classroom implementation.

5.1   Study's Implications

This study offers important implications for diverse stakeholders, including educators, policymakers, parents, and students.

Educators. Teachers in GBC can leverage the advantages of flipped classrooms to foster active learning and student engagement. The results suggest the need for targeted professional development programs to equip educators with skills in digital content creation and flipped teaching methods. Studies show that teacher training is critical for successfully adopting innovative practices (Abeysekera & Dawson, 2015; Shulman, 1986).

Policymakers. Governments and educational leaders should address the digital divide by investing in affordable internet and devices, particularly in rural areas. Access to digital tools is a prerequisite for equitable implementation of flipped learning (Betihavas et al., 2016). Additionally, policies promoting awareness campaigns about the benefits of flipped learning can help build support among parents and school administrators (Pierce & Fox, 2012). By aligning national educational strategies with technology-driven teaching approaches, policymakers can create an environment conducive to innovation.

Parents. Parents' involvement is essential in facilitating students' access to technology and encouraging participation in active learning environments. This study emphasizes the need for family-school partnerships to overcome socioeconomic barriers. Literature highlights the positive impact of parental support on educational outcomes (Epstein, 2001). Parents should

also be educated on the long-term benefits of flipped classrooms, such as developing self-directed learning and critical thinking skills.

Students. Flipped classrooms empower students to take ownership of their learning, fostering independence and a deeper understanding of the material. Active participation in digital and in-class activities develops transferable skills crucial for academic success and future employability (Bishop & Verleger, 2013). Schools should provide orientation sessions to help students adapt to this model and maximize its interactive opportunities. By fostering collaboration among these stakeholders, the challenges of implementing flipped classrooms can be mitigated, and their transformative potential can be fully realized. Future initiatives should prioritize equity, awareness, and training to ensure the scalability of this innovative approach across diverse educational contexts.

5.2   Way forward

The study's findings are significant for the unique educational landscape of Gilgit-Baltistan and Chitral, regions characterized by their remote geography, diverse cultural heritage, and resource constraints. These areas face distinct challenges, such as limited internet access, economic hardships, and a lack of technological infrastructure, which directly impact the feasibility of implementing flipped classrooms. Despite these obstacles, the study demonstrates that teachers in these regions are willing to embrace innovative pedagogical approaches, reflecting their resilience and commitment to improving education. Flipped classrooms have the potential to bridge educational disparities in these areas by fostering active engagement and personalized learning. However, successful implementation requires addressing systemic barriers. Stakeholder support, including awareness campaigns targeting parents and school administrators, is essential to mitigate resistance and foster acceptance of technology-driven learning methods. Investments in digital infrastructure, particularly in underserved areas, are critical to ensuring equitable access to the tools needed for flipped learning.

Additionally, integrating localized content into flipped classrooms can enhance their relevance and cultural resonance. Educators can create a more inclusive and engaging learning environment by incorporating region-specific examples and acknowledging students' diverse linguistic and cultural backgrounds. The study's findings underscore the importance of leveraging community resources and fostering partnerships between schools, parents, and local organizations to overcome challenges and promote sustainable educational innovation.

6.   Conclusion

This study highlights the transformative potential of flipped classrooms in fostering active learning, improving teacher-student interaction, and addressing individual student needs. While the approach has demonstrated significant benefits, such as increased motivation, engagement, and adaptability, resource constraints and stakeholder resistance challenges persist, particularly in rural contexts like Gilgit-Baltistan and Chitral. By addressing these barriers through strategic investments in infrastructure, professional development, and community engagement, the flipped classroom model can be effectively adapted to diverse educational contexts. In Gilgit-Baltistan and Chitral, where educational access and equity remain pressing concerns, flipped classrooms offer a promising pathway for bridging gaps and enhancing learning outcomes. The collaborative efforts of educators, policymakers, parents, and students are crucial to realizing this potential. By fostering awareness and building supportive networks, stakeholders can create a more inclusive and innovative educational landscape that meets the unique needs of these communities. The findings of this study serve as a call to action for investing in the future of education through the thoughtful implementation

of flipped learning methods, ensuring that no student is left behind in the pursuit of academic excellence.

Reference

Abeysekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. *Higher Education Research & Development*, *34*(1), 1–14. https://doi.org/10.1080/07294360.2014.934336

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education.

Betihavas, V., Bridgman, H., Kornhaber, R., & Cross, M. (2016). The evidence for 'flipping out': A systematic review of the flipped classroom in nursing education. *Nurse Education Today*, *38*, 15–21. https://doi.org/10.1016/j.nedt.2015.12.010

Bishop, J., & Verleger, M. (2013). The Flipped Classroom: A Survey of the Research. *2013 ASEE Annual Conference & Exposition Proceedings*, 23.1200.1-23.1200.18. https://doi.org/10.18260/1-2--22585

Bon, A., Saa-Dittoh, F., & Akkermans, H. (2024). Bridging the Digital Divide. In H. Werthner, C. Ghezzi, J. Kramer, J. Nida-Rümelin, B. Nuseibeh, E. Prem, & A. Stanger (Eds.), *Introduction to Digital Humanism* (pp. 283–298). Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-45304-5_19

Borthwick, A. C., & Hansen, R. (2017). Digital Literacy in Teacher Education: Are Teacher Educators Competent? *Journal of Digital Learning in Teacher Education*, *33*(2), 46–48. https://doi.org/10.1080/21532974.2017.1291249

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Buonsenso, D., Roland, D., De Rose, C., Vásquez-Hoyos, P., Ramly, B., Chakakala-Chaziya, J. N., Munro, A., & González-Dambrauskas, S. (2021). Schools Closures During the COVID-19 Pandemic: A Catastrophic Global Situation. *Pediatric Infectious Disease Journal*, *40*(4), e146–e150. https://doi.org/10.1097/INF.0000000000003052

Dewey, J. (1997). *How we think* (1. publ., unabridged republ). Dover Publications, Inc.

Engeström, Y. (2001). Expansive Learning at Work: Toward an activity theoretical reconceptualization. *Journal of Education and Work*, *14*(1), 133–156. https://doi.org/10.1080/13639080020028747

Gilboy, M. B., Heinerichs, S., & Pazzaglia, G. (2015). Enhancing Student Engagement Using the Flipped Classroom. *Journal of Nutrition Education and Behavior*, *47*(1), 109–114. https://doi.org/10.1016/j.jneb.2014.08.008

Gondal, S. A., Khan, A. Q., Cheema, E. U., & Dehele, I. S. (2024). Impact of the flipped classroom on students' academic performance and satisfaction in Pharmacy education: A quasi-experimental study. *Cogent Education*, *11*(1), 2378246. https://doi.org/10.1080/2331186X.2024.2378246

Gross, D., Pietri, E. S., Anderson, G., Moyano-Camihort, K., & Graham, M. J. (2015). Increased Preclass Preparation Underlies Student Outcome Improvement in the Flipped Classroom. *CBE—Life Sciences Education*, *14*(4), ar36. https://doi.org/10.1187/cbe.15-02-0040

King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. Jossey-Bass.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.

Lo, C. K. (2017). Toward a Flipped Classroom Instructional Model for History education: A Call for Research. *International Journal of Culture and History (EJournal)*, *3*(1), 36–43. https://doi.org/10.18178/ijch.2017.3.1.075

Lo, C. K., & Hew, K. F. (2017). A critical review of flipped classroom challenges in K-12 education: Possible solutions and recommendations for future research. *Research and Practice in Technology Enhanced Learning*, *12*(1), 4. https://doi.org/10.1186/s41039-016-0044-2

Lo, C. K., & Hew, K. F. (2019). The impact of flipped classrooms on student achievement in engineering education: A meta-analysis of 10 years of research. *Journal of Engineering Education*, *108*(4), 523–546. https://doi.org/10.1002/jee.20293

Mays, T. J., & Cheng, R. Z. (2024). Exploring Offline e-Learning for Resilience: A Case Study. *Journal of Learning for Development*, *11*(2), 304–310. https://doi.org/1K 0.56059/jl4d.v11i2.1288

Merriam, S. B. (2014). *Qualitative Research: A Guide to Design and Implementation* (3. Aufl). Jossey-Bass.

Ng, C., & Renshaw, P. (2020). Transforming Pedagogies in Australian Schools amid the COVID-19 Pandemic: An Activity Theoretic Reflection. *Best Evidence of Chinese Education*, *5*(2), 635–648. https://doi.org/10.15354/bece.20.or023

Pierce, R., & Fox, J. (2012). Vodcasts and Active-Learning Exercises in a "Flipped Classroom" Model of a Renal Pharmacotherapy Module. *American Journal of Pharmaceutical Education*, *76*(10), 196. https://doi.org/10.5688/ajpe7610196

Prince, M. (2004). Does Active Learning Work? A Review of the Research. *Journal of Engineering Education*, *93*(3), 223–231. https://doi.org/10.1002/j.2168-9830.2004.tb00809.x

Tarkar, P. (2020). Impact Of Covid-19 Pandemic on Education System. *International Journal of Advanced Science and Technology*, *29*(9s), 3812–3814.

Tune, J. D., Sturek, M., & Basile, D. P. (2013). Flipped classroom model improves graduate student performance in cardiovascular, respiratory, and renal physiology. *Advances in Physiology Education*, *37*(4), 316–320. https://doi.org/10.1152/advan.00091.2013

Xiu, Y., & Thompson, P. (2020). Flipped University Class: A Study of Motivation and Learning. *Journal of Information Technology Education: Research*, *19*, 041–063. https://doi.org/10.28945/4500

Xu, L.-J., Yu, S.-Q., Chen, S.-D., & Ji, S.-P. (2021). Effects of the flipped classroom model on student performance and interaction with a peer-coach strategy. *Educational Studies*, *47*(3), 292–311. https://doi.org/10.1080/03055698.2019.1701991

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE.

Zainuddin, Z., & Halili, S. H. (2016). Flipped Classroom Research and Trends from Different Fields of Study. *The International Review of Research in Open and Distributed Learning*, *17*(3), 313–340. https://doi.org/10.19173/irrodl.v17i3.2274

Zhonggen, Y., & Guifang, W. (2016). Academic Achievements and Satisfaction of the Clicker-Aided Flipped Business English Writing Class. *Educational Technology & Society*, *19*(2), 298–312. https://www.jstor.org/stable/jeductechsoci.19.2.298