Comprehensive Teaching Strategies: Learning Ecosystems for Twenty-first Century

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A r t i c l e   I n f o

A b s t r a c t

This paper aims at boosting the effectiveness of teaching ecosystems in addressing the problems of the twenty-first century. It collects facts and required information from primary and secondary sources. Ten informants involved in teaching at AB, BC, CD, DE, and EF campuses; and twenty-five learners from these institutions were taken to discuss teaching strategy and learning satisfaction. The rapid change in society and technology in the twenty-first century poses unique challenges for human beings. Recognized it as a dynamic process, learning procedure encompasses memory, reasoning, individual mindset, habits, goals, and motivation. The findings of this paper indicate that the positive remarks on preferred teaching strategies, and cooperative learning affect students' satisfaction. Research on teaching strategies suggests that learning transcends cognitive aspects, extending into social-emotional dimensions and unfolding within environmental and cultural contexts throughout an individual's lifespan. Effective learning and teaching strategies focus on cooperative, resourceful, interactive, and self-regulatory practices. Effective instruction involves a learner-centric approach and concentrates on conceptual understanding, metacognition, assessment, and technology integration, cognitive, social, and emotional development within a supportive environment. The responses gathered from tutors and learners limit the accepted applicability of the results, and the study sheds light on combined teaching strategies focusing on active teaching-learning activities in the twenty-first century.

Introduction

This paper affirms that higher education institutions are increasingly concentrating on learning ecosystems, and still there exists a deficiency in terms of interconnectedness and permeability. The distributed learning ecosystem (DLE) has been a part of an interdisciplinary perspective to examine three critical elements: concepts, resources, and repositories. The inclusion of open educational resources (OER) as a fundamental component of openness and open learning is the next essential aspect of a DLE (Otto, Scharnberg, Kerres, and Zawacki-Richter, 2023), and the concept of OER has a history more than two decades. It has undergone significant progress since UNESCO's 2002 Forum which focused on the higher education sector in developing countries. The existing teaching-learning system, as the new generation engages in a fundamental role in determining the educational domain in the foreseeable and distant future and the learners hold a significant position in the expedition of humankind to come up with evolving a more encouraging sphere.

A quality teaching-learning system at present equips individuals to become adept problem-identifiers and solvers to inscribe the concerns of existing life. The introduction of various models like distance learning (d-learning), electronic learning (e-learning), blended learning (b-learning), and online learning (o-learning) remained largely theoretical and were not extensively integrated into pedagogical practices within the higher education sector in Nepal. Daniel Otto, and *et al.* (2023) state, "The basic concept of a learning ecosystem reflects the observation that different elements interact and influence each other in today's learning processes …, a learning ecosystem comprises all services, resources, and environments within the institution that enable or support learning processes" (p. 3). The learning eco-system embraces all apparatuses backing learners' enduring experiences and incorporates the components from home to classrooms and government to governance that affect how the learners acquire new knowledge. The learning ecosystem is a part of the

teaching-learning realm and it integrates different components for developing an integrated learning atmosphere in the higher education system.
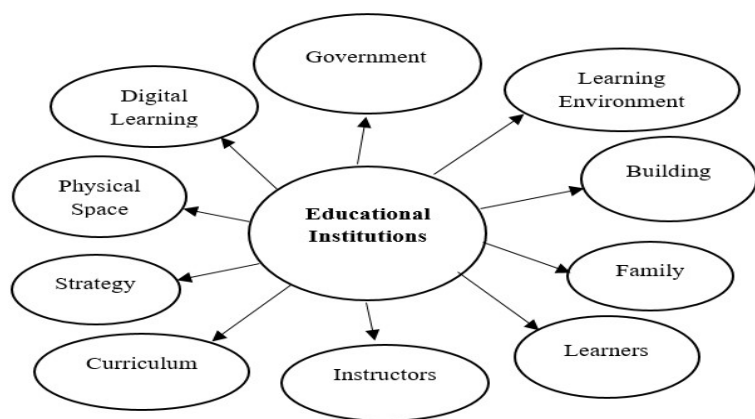

Fig. 1: Learning Ecosystem elaborated by the author, 2024

The learning ecosystem comprises the multiple constituents incorporated in Figure 1 to refer to an intricate network of interconnected associations across various environments and establishes the sequential and dynamic relationship among learners and instructors. Otto and Kerres (2023, p. 16) argue, "By introducing the term learning ecosystems, we primarily aim to reach beyond the spatial dimension of a traditional view on the organization of learning, which is strongly associated with buildings, rooms, and walls in physical spaces", and Fenwick and Edwards (2010) combine and extend this perception by concentrating on learners' assortment and interactions. An essential aspect of the DLE involves integrating OER as a fundamental component of open learning (Otto and Kerres, 2021). UNESCO's definition of higher education in developing countries (2019, p. 3) is "Learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, reuse, re-purpose, adaptation, and redistribution by others." In the context of an advanced educational ecosystem, distributed learning ecosystems (DLEs) incorporate all the services to enable learning processes by connecting content repositories and educational resources.

The paramount importance of education is undergoing a rapid transformation with the use of the internet and it has emerged as a significant scope for learning. In the twenty-first century, with learners being tech-savvy, the conventional approach to learning is outdated. They actively seek creativity and interactions; their minds crave stimulation, challenge, and engagement—an area where technology plays a crucial role. Leveraging rich graphics, audio, and gamified learning experiences provides the sensory stimulation. Moreover, recognizing the students of different age groups the learning process requires varied content, and smartphones have become invaluable instrument for connecting texts and learning environment. They facilitate flexible learning tailored to the learners' schedule, pace, and environment. Educational modules transform idle moments into opportunities for creating new ideas. The era of rapid globalization and interconnected with diverse populations swiftly evolve for technological demands for building competencies among learners. This shift has profound implications for students' learning requirements and the skills. To meet these evolving demands, learning systems worldwide are undergoing a reevaluation. They are crafting frameworks to pose greater emphasis on skills and attitudes for achieving learners' achievement through constructing skills and knowledge.

The institutional management for shifting traditional classrooms into advanced classrooms with infrastructural development and technology is necessary for prioritizing creativity, critical thinking, effective communication, collaboration, and a spirit of citizenship in each child. Nepal now presents a world marked by rapid changes, bringing forth formidable challenges for humanity. These challenges encompass environmental, economic, and social issues. The twenty-first-century learners face numerous threats including pollution, deforestation, climate change, natural disasters, political instability, military conflicts, forced migration, discrimination, and disinformation which pose a hostile environment for survival and prosperity. The global pandemic, COVID-19, highlights the pressing need for education to equip new generations to address these challenges on a global scale. Addressing the challenges of this century requires an emphasis on various aspects that contribute to motivation in the lifelong learning ecosystem and teaching strategy. It involves boosting innovation skills, nurturing a critical mindset, advocating for self-directed learning, embracing errors as valuable learning opportunities, establishing clear learning goals, promoting technology for learning and teaching

purposes, and instilling the habit of applying acquired skills in real-life situations.

Social and economic issues manifest educational environments and remain limited around the world. Higher learning-teaching institutions need to adapt swiftly to changing demands from various stakeholders. Expectations of instructors, administrators, parents, policymakers, and other participants in the learning ecosystem create complexities. To effectively confront these challenges, education systems and policymakers, along with professionals, must adapt to better equip students for the future, and cultivate new generations endowed with educational skills. It relies on the implementation of effective educational processes, demanding successful methods and strategies for learning and teaching. Contributions from educational sciences, psychology, and related fields offer valuable strategies through both research and practical applications. The learning ecosystem has common five goals as: learning for skills, learning to improve career, learning for earning, learning for getting job, and learning for being innovative for future possibilities. This paper investigates teaching strategies to analyze pedagogy trends and understand the learning ecosystem, considering various issues and issues. The research questions are: How are comprehensive teaching strategies useful for creating an effective classroom in the twenty-first century? Are the learners satisfied with the application of teaching tactics in contemporary classrooms?

Review of Literature

Education in the twenty-first century must adapt to current shortcomings and attempt effective, and inventive teaching methods to confirm a happy learning environment. González-Pérez, and Ramírez-Montoya (2022) state that the educational paradigms emphasize complete capabilities employing combined educational devices for operative classroom activities. Robotics, an interdisciplinary teaching tool, can improve classroom presentation and interaction to develop socio-cultural skills and ingenuity. To comprehensively address these aspects, Otto and Kerres (2023) state that a diverse group of recognized individuals was invited to complement the work. The intricate problems and challenges underscore the importance of specific skills in addressing these issues. Educational institutions have proposed ideas regarding the essential qualities for effective problem-solving skills in the present volatile world. The evolving technological landscape has profound implications for our actions and interactions in various domains, including the workplace, education, civic life, and home. Allen and van der (2022, p. 54) acknowledge, "…much is expected of education to help prepare our society for the great changes taking place in the twenty-first century, … it is facing many challenges of its own in terms of dealing with the consequences of demographic shifts in student and teacher populations and increased diversity". The scholars Anderson (2008), Gibbons (1998), Gumport (2000), and Adhikari (2010) recognize that the current frameworks of higher education lack the adaptability to embrace emerging methods of generating knowledge and do not adequately address the diverse needs of the learners. Pillai, Upadhyaya, Balachandran, and Nidadavolu (2019) demand a reconsideration of the traditional educational system and the exploration of a practical supplementary structure to stimulate students' curiosity to foster the acquisition of skills and knowledge across interdisciplinary domains of existing educational system.

Educational policies and practices always constitute a comprehensive and interdependent package to encompass three skills: basic skills, specific skills, and twenty-first-century skills to support them for purposeful actions. Ye and Chen (2024, p. 124) assure, "Teachers are hard gardeners, cultivate beautiful flowers, teachers are engineers of the human soul, teachers are inheritors of human civilization." There is a consensus that the traditional education system, primarily centered on content-driven knowledge transmission, is insufficient for adequately preparing the ZED learners to navigate the swiftly altering digital landscape**.** In 2002, an association established the partnership for twenty-first-century skills (P21) to concentrate on reading, writing, and mathematics. The World Economic Forum (2015) wished for the required skills in modern education, including critical thinking, creativity, collaboration, cross-cultural understanding, and literacy in various fields. These skills encompass six literacies, four competencies, and six character qualities, including curiosity, persistence, adaptability, leadership, and social/cultural awareness.

Bhanudas and Salauddin (2019) confirm that cooperative learning, active learning, and ICT-enabled learning are in practice in India. This digital transformation significantly propels major shifts in ZED learners' thinking. The scholars recognize that the emergence of a new set of skills is significant for twenty-first-century learners to effectively engage them in today's world. Late twentieth-century technology, including ICTs like personal computers, mobile phones, and the internet, significantly impacted teaching, working ability, and everyday life by introducing new technical devices. They convey the transformative impact of technological integration in higher education and converge on its potential challenges and limitations. The integration of technology in higher education can revolutionize the teaching-learning

activities by increasing students' engagement to facilitate personalized learning, and prepare students for the digital age. Individuals and organizations quickly adopted and integrated these technologies, prompting education systems to respond swiftly by incorporating these tools into their learning environments. The infusion of technology into education has fundamentally impacted the processes and procedures of learning and teaching. Effective technological usage in teaching-learning has become an integral aspect of twenty-first-century instruction, and it influence learner attitudes, motivations, thoughtful engagement, and life/career skills (Beers, 2011). Digital learning encompasses technology-mediated performances designed to aid learning, tutoring, instruction, and assessment (Wheeler, 2012). It raises significant concerns about the readiness of learners' knowledge and skills to engage in the global knowledge society. Future learners need additional knowledge and skills beyond what is provided in strict regulatory frameworks. UNESCO (2015) urges a reassessment of knowledge horizons due to complexities and inconsistencies in an interconnected world and it emphasizes the importance of technology-enhanced learning environments. The use of technology and its integration into teaching is crucial for enhancing students' exposure and meeting future demands. It expands teachers' learning through various tools, pedagogical strategies, performance, and students' engagement to highlight the need for a higher education system. Panakaje, Rahiman, Parvinc, Shareena, Madhura, Yatheen, and Irfana (2024) opine that the integration of technology significantly impacts learning and pedagogical strategies with higher institutional support enhancing performance and student engagement. It incorporates various pedagogical strategies and encourages technological development in educational settings.

In the context of the globalized knowledge and information period, Ball (2017) contends that the education system is becoming more influenced by the pressures and demands of stakeholders. The trajectory of present academic disciplines indicates a trend toward greater micro-specialization due to their expansive scope and ongoing evolution, moving away from a more integrative approach that nurtures disciplines through interdisciplinary exposure. The Organization for Economic Co-operation and Development (OECD) foresees the future of education through its Learning Framework 2030 and outlines metamorphic proficiencies e.g. generating novel ideas, integration of challenges and opportunities, and pleasing accountability. The twenty-first century higher education system requires a comprehensive set of KSAOCs as knowledge, skills, abilities, and other characteristics which integrate adaptability, creativity, curiosity, open-mindedness, integrated thinking, interconnectedness, responsibility, self-regulation, self-control, self-efficacy, and problem-solving. This goes beyond content knowledge and technical skills, encompassing personality traits like self-regulation, curiosity, and adaptability. The evolving landscape of education demands dynamic and flexible education systems to effectively nurture these KSAOCs. The criticism exists regarding the twenty-first-century skill movement concerning content, discourse, and evidence base, an increasing body of literature supports its fundamental principles.

Globally, education systems are striving to instill these skills without a unified definition or strategy. The activities and programs derived from these initiatives effectively foster characteristics essential for twenty-first-century learners, including adaptability, persistence, grit, responsibility, self-regulation, leadership, and social/cultural awareness. The cultivation of twenty-first-century skills necessitates evidence-based instructional strategies and comprehensive systems. Drawing from an ecological perspective, four key aspects creative and enlightening master plans, social and emotional progress, compassionate environments, and good educational systems outline for implication of educational practice (Darling-Hammond *et al*., 2020). As technological globalization inexorably transforms nations, education, learning, and labor markets, these developments underscore the urgency of addressing these issues (Power, 2015; Pillai, Upadhyaya, and Nidadavolu, 2019). E-learning, or d-learning is an inclusive notion that incorporates mobile learning (m-learning) (Basak *et al*., 2018) for the practice of cooperative learning. The practice of the constructivist approach can significantly enhance the effectiveness of digital learning within online and blended educational settings. The Community of Inquiry (CoI) framework, as proposed by Garrison (2016), presents a structured model to facilitate successful digital learning experiences and incorporates three interconnected constituents: cognitive, social, and teaching existence. Cognitive existence comes up with opportunities to construct and validate meaningful knowledge through continuous reflection and discourse. The context of CoI underscores the implication of teaching-learning slants for digital environments. The landscape of digital and electronic learning involves numerous design components. Khan (2001) highlights significant aspects required for building an actual learning atmosphere are pedagogical, technological, curriculum design, assessment, management, resource, and ethical dimensions. In addition, an alternative e-learning model tailored for developing countries has been projected, drawing insights from literature and ICT perspectives. It underlines the meticulous crafting of d-learning to provide a valuable educational experience, supporting the learning and development of both students and teachers (Bhuasiri *et al*., 2012). Beyond technological and institutional aspects,

d-learning experiences prioritize individuals and relationships, aligning with the demands of twenty-first-century skills. Effective digital learning experiences cultivates technological literacy, skills, personality characteristics, and competencies. Continuous professional development and institutional support are needed to address the classroom activities. Nepal is concentrating on twenty-first century teaching skills through strategical transformation developing policies form Tribhuvan University (TU) and Nepal Open University (NOU) to improve teachers' digital pedagogy capacity. It reveals major differences in teachers' skills in Nepal.

Research Methodology

This part of the study focuses on the research methodology and context directed by the research questions. The University Grant Commission (UGC) report states that Tribhuvan University (TU) owns 64 constituent, 528 community, and 554 private campuses, and 78.36 percent of students study at TU. Three constituent campuses are selected from Kathmandu valley, one community campus is selected from Gandaki Province, and one private campus is selected from Kathmandu. Three constituent campuses are coded AB, BC, and CD; the community campus is signified as DE, and finally, the private campus is coded as EF. These campuses range from the humanities to management, education, and law. Among them, campuses coded DE (community campus) and EF (private campus) are QAA-certified campuses.

The research context of this paper deals with teaching strategies applied in the Nepalese higher education system. Distinct codes (AB, BC, CD, DE, and EF) are employed to protect respondents' privacy. Tutors (AB, BC, CD, DE, and EF) and learners (AB, BC, CD, DE, and EF comprised the key respondents. Two tutors from each campus were selected for narrative analysis, and five students from each campus were taken for discussion to understand the trend of the second research question. Every respondent was asked five open-ended questions for the interview and the discussion took place for thirty minutes to explore the issues of research questions. The narrative approach was used to assess the qualitative data. According to Hoshmand (2005), human inquiry generates narrative information, whereas narrative analysis investigates pertinent points of view (Riessman, 1993). In a rapidly shifting learning environment, researchers must stay ahead to offer the best learning experiences.

Pedagogical trend analysis is a methodical appraisal of educational inclinations and aims to identify patterns for teaching strategies and curriculum development. The analysis of pedagogical trends is the implementation of identifying the solutions to the "problems of impact of the globalization phenomenon upon the educational process and social sciences, paying attention to challenges in modern pedagogy and psychology" (Gumennykova, and *et al*., 2023, p. 53). The expansion of society relies on personality perfection and the self-realization of knowledge enhancement through the implementation of effective teaching strategies. Lee and Stensaker (2021) state that the interconnectedness and dependence between the local, national, and global systems of education and its pedagogy impact society in different ways. For this, the first research question measures the use of teaching strategies in the classrooms, and the second question aims to explore how the learners are satisfied with the teaching strategies.

Findings and Discussion

The comprehensive teaching strategy is an instructional method to accomplish teaching-learning goals. It brings about increased flexibility and empowerment in terms of learning pace, self-directed coverage, and capability building, marking a foundational shift in the perspective of learning. In navigating the complexities of predicting skill requirements for future professions due to rapid advancements in technology and science, graduates must cultivate adaptability and resilience (UNESCO, 2015). To harness the collective power of minds, interactive and comprehensive along with cooperative learning emerge as effective pedagogical approaches. Slavin (1999) states that the comprehensive cooperative learning model integrates texts and teaching methods, and enables tutors to routinely use effective cooperative learning methods in core academic areas. In contrast to individualistic learning, cooperative learning optimizes individual and collective learning by utilizing small groups (Razzouk and Johnson, 2012). Cooperative learning is a teaching-learning method and both tutors and learners explore new ideas rather than relying solely on the teachers' presentation. It allows for active discussion and active engagement with the reading material for becoming experts in designing intellectual experiences for students. The interactive engagement of learners in the classroom significantly influences the learning and teaching processes (Udvari-Solner, 2012).

Concerning the first research question, the learning ecosystem deals with ten components (Figure 1), and 8 tutors have agreed that effective teaching strategy is a part of comprehensive learning. In both interactive and cooperative learning groups, tutors typically share authority and assign more closed-ended group tasks. However, 6 tutors opine

that it is very difficult to implement cooperative teaching strategy in the daily classrooms. It engages the students in discussion to create a shared problem space where they collectively elaborate to generate knowledge (Baker, 2015). 7 tutors have viewed that if the learning ecosystem becomes the part of effective teaching strategies, it will be effective in developing critical skills for lifelong learning. The integration of emerging learning spaces on a unified platform has the potential to generate synergies (UNESCO, 2015). Globally, universities are actively competing to enhance their academic reputation to transform the higher education landscape (Hazelkorn, 2011). Developing critical skills shifts, the focus from the growth and expansion of the educational system to a heightened concern for the quality of the educational process. Essential prerequisites for establishing world-class universities include the enrichment and integration of academic disciplines (Wang, Wang, and Liu, 2011). Carnoy *et al*. (1999) and Pillai, *et al*. (2019) integrate a higher education teaching-learning system to eliminate poverty and ensure human rights in local to global settings.

The social contract of relentless global competition and interconnectedness of learning raises fundamental questions about the future viability of the current university model. UNESCO (2015) emphasizes the need for more responsive education and professional skill development, urging greater diversification and flexibility to adapt to the emergence of new professions and associated skill sets. Tutors in the Nepalese higher education system are not sincere in creating discourses for fulfilling the objectives of programs and curricula. If implemented effectively, it develops a system for the implementation of comprehensive teaching strategies to endorse reforms in the Nepalese education system. One tutor from the community campus explained as:

> Comprehensive teaching is a holistic educational approach to improve students' engagement, behavior, and academic performance. It leads to better life outcomes, as students with strong social skills excel in higher education and careers. To achieve this, a strength-based comprehensive approach takes time to plan, integrates holistic education into core subjects, builds strong learner-tutor relationships, fosters a supportive classroom community, equips educators and staff with skill development opportunities, prioritizes implementation fidelity, and uses data to strengthen the program. This approach enhances students' engagement to foster self-awareness, resilience, and improved academic performance.

This observation exhibits various characteristics and elements of learning as pointed out by Johnson and Johnson (1999) to comprise heterogeneous members, and it offers mutual academic and social support over one or more years. Özdoğru (2005, 2022) claims that cooperative and collaborative learning are confirmed to be operative instructional strategies in both traditional and digital learning environments.

The discussion with the tutors reveals that the effectiveness of the comprehensive teaching strategy depends on various factors like learners' age, subject domains, technology, pedagogy, and culture. Successful application of teaching strategy considers the strategy of culturally suitable application. One of the tutors of constituent campuses of Kathmandu remarks:

> The twenty-first century presents unique challenges for humanity, necessitating strategies for effective learning and teaching. Comprehensive learning is a dynamic process supported by reasoning and an individual mindset. Strategies should focus on active, authentic, cooperative, creative, interactive, personalized, relational, and self-regulative learning. Instruction should be centered on the learner and knowledge, promoting conceptual understanding and metacognition. Quality education trains problem-solvers to address life and future challenges and is crucial for humanity's future.

The twenty-first century presents challenges to education systems worldwide, including limited resources, changing stakeholder demands, and technological disruptions. Özdoğru (2022) states to prepare students for the future, education systems must adapt to these complexities, with new generations of individuals equipped with the twenty-first-century skills for addressing these challenges.

Cooperative learning methods comprise students' team-achievement divisions, tournaments, and individualization. It combines reading, interaction, group investigation, and positive approaches (Kyndt *et al*., 2013, and Özdoğru, 2022). It develops interpersonal and social skills among students to promote interaction, and form cohesive groups for generating required skills and knowledge. Learners become accountable in the learning process which brings economic, cultural, social and political transformation. In the contemporary context of the twenty-first century, learning holds particular relevance them enable them to actively shape their educational journey. Implementation of comprehensive learning in digital settings contributes to the cultivation of learners' competencies (Chu *et al.,* 2021). The

proficient implication of inductive educational approaches fosters learners' progress in crucial areas such as creativity, critical thinking, and problem-solving. Human learning thrives on active involvement and participation.

The thirst for knowledge is characterized as "a range of teaching approaches in which learning is stimulated by a question or issue, based on constructing new knowledge and understanding, with the teacher's role as a facilitator, and a move towards self-directed learning" (Spronken-Smith *et al.*, 2011, p. 15). It empowers learners to acquire information in a single class or throughout a semester. Noguera, Quesada-Pallares, and Sepulveda-Parrini (2024) observe that learners reported the most satisfaction with learning strategies and group work in teaching. In the case of Nepal, learners preferred face-to-face teaching with practical exercises, group work, and lectures being the most effective teaching strategies. It discovers learning as in-time teaching, and problem-based learning or project-based learning (Prince and Felder, 2006) which encompasses diverse characteristics and modes of learning. The trend analysis of pedagogical strategies builds knowledge to ascertain the structures of teaching strategies and curriculum development.

The informants from the AB, BC, and CD sectors are satisfied with the teaching strategies implemented by the tutors in the classroom. 10 learners out of 15 in this sector agree that the tutors incorporate effective teaching-learning strategies to develop creative skills. The informants from the DE and EF are optimistic about the teaching-learning strategies of tutors. Altogether 15 learners opine that the relationship between the learning ecosystem and effective teaching strategies promotes entrepreneurship to improve learners' livelihoods and economic development. One of the learners from BC expressed as:

> This teaching strategy connects to enhance skills and knowledge acquisition related to comprehensive. Most of the learners prefer the most experienced teaching strategies, possibly due to responsible faculties. Now it is a time to engage the learners in practical work rather than teaching theoretical content only. As it elevates learners, understanding by presenting and solving open-ended problems to foster a thirst for knowledge.

Comprehensive learning elevates learners' understanding to facilitating the discovery and improvement for knowledge (Edelson *et al.*, 1999). Learning is for engaging with complex open-ended problems, learner-managed inquiry methods to identify learning needs, stimulating curiosity, leading to exploration and exploration, and supporting responses to complications (Kahn and O'Rourke 2005). Only 10 informants from these five sectors express that tutors focus on these aspects of problem-solving learning. However, it occurs in three modes based on the degree of teacher-provided support: controlled, directed, and open inquiry (Spronken-Smith & Walker, 2010), showcasing its potential across various dimensions. 16 learners respond that the tutors fail to establish the relationship between curricula, classroom activities, through collaboration. However, favoring comprehensive teaching for inquiry-based learning on community campuses shows a constructive consequence (Furtak *et al.*, 2012). It elaborates on the context of the higher education system in Nepal. Teachers, curriculum, collaboration among students, and the management system support the learners in the development of skills and generate knowledge for employment, creating jobs, and being innovative in entrepreneurship. The following figure indicates the same characteristics.

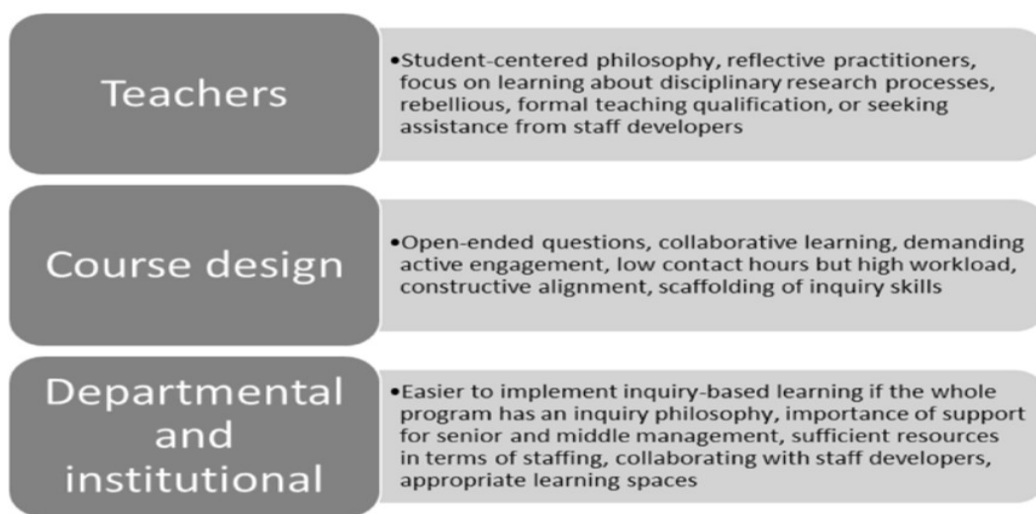| Teachers	• Student-centered philosophy, reflective practitioners, focus on learning about disciplinary research processes, rebellious, formal teaching qualification, or seeking assistance from staff developers
Course design	• Open-ended questions, collaborative learning, demanding active engagement, low contact hours but high workload, constructive alignment, scaffolding of inquiry skills
Departmental and institutional	• Easier to implement inquiry-based learning if the whole program has an inquiry philosophy, importance of support for senior and middle management, sufficient resources in terms of staffing, collaborating with staff developers, appropriate learning spaces

Fig. 2: Attributes for effective implementation of inquiry-based learning, by Spronken-Smith *et al.* (2011)

Technology-device-integrated learning programs show a positive effect on improving students' success,

particularly impacting cognitive consequences in learning domain (Zheng *et al.*, 2018). Students' role as legitimate referees provides rational and credible evidence due to their diverse educational experiences. One of the tutors from DE express about quality education and learners' satisfaction as:

> Quality education is evaluated on perceived quality; and learning satisfaction is a psychological state influenced by disconfirmed expectations and prior feelings. Students' satisfaction is a short-term attitude resulting from their educational experience. Satisfaction is influenced by academic and social experiences in education-based institutions, and it refers to the positive emotions associated with the institution. Students' satisfaction is a satisfactory feeling for their university experience when expectations are met or exceeded.

It shows that the relationship between perceived quality and satisfaction in higher education institutions reveals that perceived service quality, particularly related to teaching and learning, positively influences students' satisfaction. These relationships are significantly different when students are exposed to different teaching methods. 17 students out of 25 agree that comprehensive teaching strategies should be interconnected to deliver classes to the learners of the ZED generation. This paper emphasizes the significance of tutors' supervision to offer learning practice and enlightenment (Lazonder and Harmsen, 2016) justifies more assertive than individual activities. Higher education institutions face increasing competition in the twenty-first century for quality output pressures.

Conclusion

This paper explores the effectiveness of teaching strategies in the twenty-first century, focusing on teaching strategy and learners' satisfaction. It highlights the importance of a learner-centric approach, and fostering a nurturing environment. It foregrounds the need for active teaching-learning activities and the need for supporting systems to nurture cognitive, social, and emotional development. Effective learner-centered instruction, conceptual understanding, and the acquisition of learning skills are ensured through productive instructional strategies and social/emotional developmental practices. The comprehensive learning system supports incorporating a multi-tiered approach and extends learning opportunities to address the needs of learners within a broader context. Higher education involves proficient teaching-learning strategies efficacious for equipping new generations with the knowledge and constructing necessary skills for being innovative. Cooperation at both individual and societal level is key to establishing and sustaining quality education for all. This teaching strategy is crucial for preparing graduates with the indispensable skills demanded by the rapidly evolving digital era. Bridging the gap between acquired skills and those who are in demand is essential for navigating intricate future pathways and avoiding deviations. In an interconnected world, the relevance of single-degree programs diminishes, necessitating a careful overhaul of the educational framework to accommodate the unpredictable future. To meet the evolving aspirations of future students, the Nepalese higher education system must embrace learning innovations. The growing significance of digital and student-centered learning, providing flexibility and empowerment in terms of pace and content coverage, underscores the need for a paradigm shift in the twenty-first century. By facilitating supplementary learning opportunities, higher education can enhance its reputation and cater to academically ambitious students. It is crucial to clarify that the proposed teaching strategy serves as a supplementary architecture to shape the minds of learners. This approach seeks to effectively recalibrate the current system, enabling learners to thrive in the emerging pluralistic world without diminishing the value of the existing educational structures. The Nepalese higher education system has to do with drastic improvements in handling the classes. The productive instructional strategies to nurture and support the environment are the cognitive, social, and emotional development of learners. This conclusion inspires Nepalese tutors and learners to adopt a cooperative learning approach to address the issues of higher education by managing comprehensive teaching strategies that secure the future of Zed generations.

References

Adhikari, D. R. (2010). Knowledge Management in Academic Institutions. *International Journal of Educational Management, 24*(2), pp. 94–104. doi.org/ 10.1108/09513541011020918

Allen, J. & van der Velden, Rolf. (2022). Skills for the 21st Century: Implications for Education, *Research Centre for Education and the Labour Market.*

Anderson, T. (2008). Towards a Theory of Online Learning. In T. Anderson (Ed.), *Theory and Practice of Online Learning*. Athabasca University Press, pp. 45-74.

Aras Bozkurt, A. & Stracke, C. M. (2023). The Shift toward Openness in Education and the Implications for Learning Ecosystems and Ecologies, *Distributed Learning Ecosystems:* Concepts, Resources, and Repositories*,* Springer, pp. 31-46.

Baker, M. J. (2015). Collaboration in Collaborative Learning. *Interaction Studies, 16*(3), pp. 451–473. https://doi.org/10.1075/is.16.3.05bak

Ball, S. J. (2017). *The Education Debate*. Policy Press.

Basak, S. K., Wotto, M., and Bélanger, P. (2018). E-learning, M-learning and D-learning: Conceptual definition and comparative analysis. *E-Learning and Digital Media, 15*(4), pp. 191–216. https://doi.org/10.1177/2042753018785180

Beers, S. Z. (2011). *Teaching 21st Century Skills: An ASCD Action Tool*. Association for Supervision and Curriculum Development.

Bhanudas, B. V. & Salauddin, B. J. (2019). Teaching and Learning Strategies in 21St Century. Indian *Journal of Lifelong Learning and Development,* pp. 36-40.

Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J. J., & Ciganek, A. P. (2012). Critical Success Factors for e-learning in Developing Countries: A Comparative Analysis between ICT Experts and Faculty. *Computers and Education, 58*(2), pp. 843–855. https://doi.org/10.1016/j.compedu.2011.10.010

Carnoy, M., Hallak, J., & Caillods, F. (1999). *Globalization and Educational Reform: What Planners Need to Know. UNESCO, International Institute for Educational Planning.* Retrieved from https://pdfs.semanticscholar.org/5f02/44fc4796e70 acb1f0 ead67f1882470259b85.pdf

Cho, Y. H. (2015). Collaborative Learning and 21st-century Skills. In J. Spector (Ed.), *The SAGE encyclopedia of educational technology*, pp. 129–130. Sage. https://doi.org/10.4135/9781483346397.n59

Chu, S. K. W., Reynolds, R. B., Tavares, N. J., Notari, M., & Lee, C. W. Y. (2021). 21st-century Skills Development through Inquiry-based Learning: From Theory to Practice. *Springer International Publishing*. https://doi.org/10.1007/978-981-10-2481-8

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for Educational Practice of the Science of Learning and Development. *Applied Developmental Science, 24*(2), pp. 97–140. https://doi.org/10.1080/10888691.2018.1537791

Dhakal, B. P. (2023). "Pedagogical Use of 21st Century Skills in Nepal." *CHINTAN-DHARA: A Multidisciplinary 17*, 1-13. https://doi.org/10.3126/cd.v17i01.53252.

Driscoll, M., & Carliner, S. (2005). *Advanced web-based Training Strategies: Unlocking Instructionally Sound Online Learning*. Pfeiffer.

Eachempati, P., Kumar KS, K. & Rashid Hj Ismail, A. (2017). Cooperative Learning through Jigsaw Classroom Ttechnique for Designing Cast Partial Dentures - a Comparative Study, MedEdPublish.

Edelson, D. C., Gordin, D. N., & Pea, R. D. (1999). Addressing the Challenges of Inquiry-based Learning through Technology and Curriculum Design. *Journal of the Learning Sciences, 8*(3–4), pp. 391–450. https://doi.org/10.1080/10508406.1999.9672075

Fenwick, T., & Edwards, R. (2010). *Actor-network Theory in Education. In Actor-Network Theory in Education*. Routledge. https://doi.org/10.4324/9780203849088.

Furtak, E. M., Seidel, T., Iverson, H., & Briggs, D. C. (2012). Experimental and Quasi-experimental Studies of Inquiry-based Science Teaching: A Meta-analysis. *Review of Educational Research, 82*(3), pp. 300–329. https://doi.org/10.3102/0034654312457206

Garrison, R. (2016). *E-learning in the 21st century: A Community of Inquiry Framework for Research and Practice* (3rd ed.). Routledge.

Gibbons, M. (1998). *Higher Education Relevance in the 21st Century.* Retrieved from https://files.eric.ed.gov/fulltext/ED453721.pdf

González-Pérez, L. I., and Ramírez-Montoya, M. S. (2022). Components of Education 4.0 in 21st Century Skills Frameworks: Systematic Review. *Sustainability 14*(3), 1493; https://doi.org/10.3390/su14031493.

Gumport, P. J. (2000). Academic Restructuring: Organizational Change and Institutional Imperatives. *Higher Education*, *39*(1), pp. 67–91. Retrieved from https://doi.org/10.1023/A: 1003859026301

Gurley, L. E. (2018). Educators' Preparation to Teach, Perceived Teaching Presence, and Perceived Teaching Presence Behaviors in Blended and Online Learning Environments. *Online Learning, 22*(2), pp. 197–220. https://doi.org/10.24059/olj.v22i2.1255

Gumennykova, T., Pryimak, V., Myroshnychenko N., & Bazyl, O. (2023). Analysis of Trends in Pedagogy and Psychology: Implementation of Globalization Solutions. *Futurity Education*, *3*(2), pp. 52-75. https://doi.org/10.57125/FED.2023.06.25.04.

Hazelkorn, E. (2011). *Globalization and the Reputation Race in Rankings and the Reshaping of Higher Education: The Battle for World Class Excellence.* London: Palgrave MacMillan.

Hoshmand, L. (2005). Narratology, Cultural Psychology, and Counselling Research. *Journal of Counseling Psychology*, *52*(2), pp. 178-186.

Jeong, H., Hmelo-Silver, C. E., & Jo, K. (2019). Ten Years of Computer-supported Collaborative Learning: A Meta-analysis of CSCL in STEM Education during 2005–2014. *Educational Research Review, 28*, 100284. https://doi.org/10.1016/j.edurev.2019.100284

Johnson, D. W., and Johnson, R. T. (1999). Making Cooperative Learning work. *Theory into Practice, 38*(2), pp. 67–73. https://doi.org/10.1080/00405849909543834

Johnson, D. W., & Johnson, R. T. (2004). The Three Cs of Promoting Social and Emotional Learning. In J. E. Zins, R. P. Weissberg, M. C. Wang, & H. J. Walberg (Eds.), *Building academic success on social and emotional learning: What does the research say?* (pp. 40–58). Teachers College Press.

Kauffman, H. (2015). A Review of Predictive Factors of Student Success in and Satisfaction with Online Learning. *Research in Learning Technology*, 23. https://doi.org/10.3402/rlt.v23.26507

Kahn, P., and O'Rourke, K. (2005). Understanding Enquiry-based Learning. In T. Barrett, I. Mac Labhrainn, & H. Fallon (Eds.), *Handbook of Enquiry & Problem-based Learning*, pp. 1–12. CELT.

Kern, A. L., Moore, T. J., & Akillioglu, F. C. (2007). Cooperative learning: Developing an Observation Instrument for Student Interactions. *Proceedings of the 37th ASEE/IEEE Frontiers in Education Conference*, Milwaukee, WI. https://doi.org/10.1109/FIE.2007.4417852

Koehler, M. J., & Mishra, P. (2008). Introducing TPCK. In AACTE Committee on Innovation and Technology (Ed.), *Handbook of technological pedagogical content knowledge (TPCK) for educators*, pp. 3–30. Routledge.

Kyndt, E., Raes, E., Lismont, B., Timmers, F., Cascallar, E., & Dochy, F. (2013). A Meta-analysis of the Effects of Face-to-face Cooperative Learning. Do Recent Studies Falsify or Verify Earlier Findings? *Educational Research Review, 10*, 133–149. https://doi.org/10.1016/j.edurev.2013.02.002

Lazonder, A. W., & Harmsen, R. (2016). Meta-analysis of Inquiry-based Learning: Effects of Guidance. *Review of Educational Research, 86*, pp. 681-718. https://doi.org/10.3102/0034654315627366

Lee, J. J., & Stensaker, B. (2021). Research on Internationalisation and Globalisation in Higher Education: Reflections on Historical Paths, Current Perspectives and Future Possibilities. *European Journal of Education*, *56*(2), pp. 157–168. https://doi.org/10.1111/ejed.12448.

McCutcheon, K., Lohan, M., Traynor, M., & Martin, D. (2015). A Systematic Review Evaluating the Impact of Online or Blended Learning vs. Face-to-face Learning of Clinical Skills in Undergraduate Nurse Education. *Journal of Advanced Nursing*, *71*(2), pp. 255–270. https://doi.org/10.1111/jan.12509

McNaught, C., Lam, P., & Cheng, K. F. (2012). Investigating Relationships between Features of Learning Designs and Student Learning Outcomes. *Educational Technology Research and Development,* 60(2), pp. 271–286. https://doi.org/10.1007/s11423-011-9226-1

Noguera, I., Quesada-Pallares, C., & Sepulveda-Parrini, P. (2024). Analysing student satisfaction with teaching strategies in vocational education. *Education Training, 66* (10), pp. 75-90 DOI 10.1108/ET-02-2023-0062

Organisation for Economic Co-operation and Development. (2018). *OECD Learning Framework 2030* (Position paper). OECD. http://www.oecd.org/education/2030-project/contact/E2030_Position_Paper_(05.04.2018).pdf

Otto, D., & Kerres, M. (2021). Deconstructing the Virtues of Openness and its Contribution to Building in the Digital Age. In D. Kergel, M. Paulsen, J. Garsdal, & B. Heidkamp-Kergel (Hrsg.), *Bildung in the Digital Age* (pp. 47–63). Routledge. https://doi.org/10.4324/9781003158851-5.

Otto, D. & Kerres, M. (2023). Distributed Learning Ecosystems in Education: A Guide to the Debate *Distributed Learning Ecosystems: Concepts, Resources, and Repositories*. Springer, pp. 13-30.

Otto, D., Scharnaberg, G., Kerres, M. & Zawacki-Richter, O. (2023). Introduction, *Distributed Learning Ecosystems: Concepts, Resources, and Repositories*, Springer, pp. 1-10.

Özdoğru, A. A. (2005). Computer Skills and Student Attitudes toward Online Courses: A Narrative Review of the Literature. In M. Bose & D. A. Chapin (Eds.), *Proceedings of the 19th annual Edward F. Kelly evaluation conference*, pp. 105–121. University at Albany Evaluation Consortium.

Özdoğru, A. A. (2022). Revisiting effective instructional strategies for Twenty-First-Century Learners. *Educational Theory in the 21st Century Science, Technology, Society and Education.* (Eds) Yusuf Alpaydın, Cihad Demirli. Springer Nature, pp. 175-195.

Panakaje, N., Rahimanb, H. U, Parvin, S. M. R, Shareena P. Madhura, K. , Yatheen and Irfana, S. (2024). Revolutionizing Pedagogy: Navigating the Integration of Technology in Higher Education for Teacher Learning and Performance Enhancement. Cogent Education, Vol. 11(1)https://doi.org/10.1080/2331186X.2024.2308430

Paul, J., and Jefferson, F. (2019). A Comparative Analysis of Student Performance in an Online vs. Face-to-face Environmental Science Course from 2009 to 2016. *Frontiers in Computer Science*, *1*, 7. https://doi.org/10.3389/fcomp.2019.00007

Pillai, K. R., Upadhyaya, P. Balachandran, A., and Nidadavolu, J. (2019). Versatile Learning Ecosystem: A Conceptual Framework. *Higher Education for the Future*. Vol. 6(1): pp. 85–100, DOI: 10.1177/2347631118802653 journals.sagepub.com/home/hef.

Prince, M. J., and Felder, R. M. (2006). Inductive Teaching and Learning Methods: Definitions, Comparisons, and Research Bases. *Journal of Engineering Education, 95*, pp. 123–138. https://doi.org/10.1002/j.2168-9830.2006.tb00884.x

Razzouk, R., and Johnson, T. E. (2012). Cooperative Learning. In N. M. Seel (Ed.), *Encyclopedia of the Sciences of Learning*. Springer. https://doi.org/10.1007/978-1-4419-1428-6_207

Riessman, C. K. (1993). "Narrative analysis", *Qualitative Research Methods Series*, Sage Publications, Thousand Oaks.

Shea, P., McCall, S., and Özdoğru, A. A. (2006). Adoption of the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) among Higher Education Faculty: Evidence from the State University of New York

Learning Network. *Journal of Online Learning and Teaching, 2*(3), 136–157.

Slavin, R. E. (1999). Comprehensive Approaches to Cooperative Learning. *Theory Into Practice,* Vol. 38 (2), pp. 74-79. https://www.jstor.org/stable/1477226

Spronken-Smith, R., and Walker, R. (2010). Can Inquiry-based Learning Strengthen the Links between Teaching and Disciplinary Research? *Studies in Higher Education, 35*, 723–740. https://doi.org/10.1080/03075070903315502

Spronken-Smith, R., Walker, R., Batchelor, J., O'Steen, B., and Angelo, T. (2011). Enablers and Constraints to the use of Inquiry-based Learning in Undergraduate Education. *Teaching in Higher Education,* 16(1), 15–28. https://doi.org/10.1080/1356251 7.2010.507300

Thai, N. T. T., De Wever, B., and Valcke, M. (2020). Face-to-face, Blended, Flipped, or Online Learning Environment? Impact on Learning Performance and Student Cognitions. *Journal of Computer Assisted Learning, 36*(3), 397–411. https://doi. org/10.1111/jcal.12423

Tinzmann, M. B., Jones, B. F., Fennimore, T. F, Bakker, J., Fine, C., and Pierce, J. (1990). *What is the Collaborative Classroom?* North Central Regional Educational Laboratory.

Udvari-Solner, A. (2012). Collaborative learning. In N. M. Seel (Ed.), *Encyclopedia of the Sciences of Learning*. Springer. https://doi.org/10.1007/978-1-4419-1428-6_817

UGC. Annual Report 2022/23. https://www.ugcnepal.edu.np/uploads///upload/8nBFOJ.pdf

UNESCO. (2015). *Rethinking Education: Towards a Global Common Good.* Retrieved from http://unesdoc.unesco.org/images/0023/002325/232555e.pdf

UNESCO. (2019). Draft Recommendation on Open Educational Resources. UNESCO. General conference, 40th, 2019, UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000370936.

Wheeler, S. (2012). E-Learning and Digital Learning. In N. M. Seel (Ed.), *Encyclopedia of the Sciences of Learning*. Springer. https://doi.org/10.1007/978-1-4419-1428-6_431

Wang, Q. H., Wang, Q., and Liu, N. C. (2011). Building world-class Universities in China: Shangai Jiao Tong University. In P. G. Altaback, & J. Salmi (Eds.), The Road to Academic Excellence: The Making of World Class Research Universities. pp. 33–62. Washington, DC: The World Bank.

World Economic Forum (2015). *New Vision for Education: Unlocking the Potential of Technology*. http://www3.weforum.org/docs/WEFUSA_NewVisionforEducation_Report2015.pdf

Ye, L. and Chen, Y. (2024).The Research on Teaching Methods. *Lecture Notes in Education Psychology and Public Media*, 50(1), pp. 124-130. DOI: 10.54254/2753-7048/50/20240906

Zheng, L., Li, X., Tian, L., and Cui, P. (2018). The Effectiveness of Integrating Mobile Devices with Inquiry-based Learning on Students' Learning Achievements: A Meta-analysis. *International Journal of Mobile Learning and Organisation, 12*(1), pp. 77–95. https://doi.org/10.1504/IJMLO.2018.089238