

ASSESSING THE INTEGRATION OF 21ST-CENTURY SKILLS IN PUBLIC SENIOR HIGH SCHOOL CURRICULA: BASIS FOR CURRICULUM ENHANCEMENT IN TAGBILARAN CITY, BOHOL

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ABSTRACT

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Integration of 21st-century skills refers to the systematic embedding of the essential skills into instructional practices. The study assessed how the curriculum of the public senior high schools in Tagbilaran City incorporates 21st-century skills. Specifically, it examined the extent of teachers' integration in Learning and Innovation Skills (LIS), Information, Media, and Technology Skills (IMTS), and Life and Career Skills (LCS). The study also assessed the students' proficiency in the aforementioned skills. Moreover, it investigated the correlation between teachers' integration perceptions and students' proficiency level perceptions. It employed a quantitative descriptive research design and a survey questionnaire to gather data. A stratified random sampling was utilized to obtain a total of 54 teacher respondents and 440 student respondents from the selected schools. Findings revealed that teachers had the highest mean score in LIS, while they scored lowest in IMTS. Meanwhile, students had the highest mean score in



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LCS and got the lowest mean score in LIS. Furthermore, the Spearman rank correlation revealed no significant correlation between teachers' integration perceptions and students' perceived proficiency levels in LIS, IMTS, and LCS. The result suggests a perceptual disconnect between how teachers believe they are integrating and how students perceive their proficiency in 21st-century skills.

INTRODUCTION

The twenty-first century is characterized by unprecedented technological advancement, globalization, and the rapid expansion of knowledge economies. These transformations have significantly altered the competencies required for success in education, employment, and civic life. Consequently, educational systems are increasingly expected to develop learners who possess not only disciplinary knowledge but also higher-order thinking skills, adaptability, collaboration, communication, and digital literacy necessary for navigating complex and dynamic environments. As societies become more interconnected and information-rich, students must acquire competencies that enable them to respond effectively to evolving personal, social, and professional challenges (Voogt et al., 2013; OECD, 2018).

Consequently, educational systems around the globe have increasingly recognized the importance of incorporating 21st-century skills into their curricula. Traditional teaching approaches are progressively evolving into more learner-centered and interdisciplinary practices (Drake & Reid, 2020). In Asia, educational reforms have adapted to the evolving needs of technology and the labor market. Le et al. (2022) observed that automation and technological innovation necessitate that educational institutions, especially those focused on technical and vocational training, prepare students with skills pertinent to contemporary industries. Despite the implementation of the K–12 curriculum and ongoing reforms under the MATATAG Agenda, concerns remain about learners' preparedness in critical thinking, problem-solving, and digital literacy.

Recent national and international assessments have underscored the need to strengthen learners' higher-order thinking and problem-solving competencies. Results from international large-scale assessments indicate that many learners continue to struggle to apply knowledge in authentic situations, highlighting the need for educational institutions to intentionally cultivate competencies associated with twenty-first-century learning (OECD, 2023). These developments reinforce the importance of examining how schools integrate 21st-century skills into curriculum implementation and classroom instruction.

Theoretical Framework. This study is anchored in the 21st-Century Learning Framework developed by the Partnership for 21st Century Skills (2011), which identifies three major skill domains essential for learners: Learning and Innovation Skills, Information, Media, and Technology Skills,

and Life and Career Skills. The framework emphasizes that these competencies are necessary for students to adapt to the demands of modern education, work, and society.

The study is further supported by John Dewey's Constructivist Theory (1938), which emphasizes active learning through experience and interaction. Constructivism suggests that learners develop knowledge and skills through collaboration, reflection, and engagement in meaningful activities. In this study, the theory supports the idea that 21st-century skills can be strengthened when students are given opportunities for critical thinking, problem-solving, communication, and collaborative learning.

The study is likewise informed by Bandura's Social Cognitive Theory (1986), particularly the concept of self-efficacy. The theory posits that individuals' perceptions of their capabilities influence their motivation, behavior, and performance. In the context of this study, students' perceived proficiency in 21st-century skills may be influenced not only by instructional experiences but also by their confidence in applying these competencies in academic and real-world contexts. This perspective provides additional explanation for possible differences between teachers' perceptions of integration and students' perceptions of proficiency.

Together, these frameworks provide the foundation for examining how teachers integrate 21st-century skills into instruction and how students perceive their proficiency in these competencies.

Legal Bases. This study is supported by several policies and frameworks that promote the integration of 21st-century skills into education. Sustainable Development Goal 4 (SDG 4) aims to ensure inclusive and quality education while promoting lifelong learning opportunities for all (United Nations, 2016). The framework highlights the importance of developing competencies related to employment, global citizenship, and digital literacy.

Republic Act No. 10968, or the Philippine Qualifications Framework Act of 2018, also supports competency-based education and lifelong learning by aligning educational programs with industry and labor market demands. Similarly, Republic Act No. 10533, or the Enhanced Basic Education Act of 2013, institutionalized the K–12 curriculum to prepare learners for higher education, employment, and entrepreneurship through globally competitive education. These policies collectively reinforce the need to integrate 21st-century skills into classroom instruction and curriculum development.

Related Literature. Researchers have observed that while the importance of 21st-century skills is widely acknowledged, their integration into curriculum and assessment remains inconsistent (Voogt et al., 2013). Learning and Innovation Skills emphasize creativity, communication, collaboration, and critical thinking, which are considered important competencies for modern learners (Rizaldi et al., 2020). Alshammari and Thomran (2023) further noted that creativity and innovation contribute to both educational and national development.

Information, Media, and Technology Skills focus on learners' ability to access, evaluate, and use digital information effectively. Alismail and McGuire (2015) explained that technology provides opportunities for independent learning and access to information, while the OECD (2018) stressed the increasing importance of digital competencies in a rapidly changing world.

Meanwhile, Life and Career Skills highlight adaptability, leadership, accountability, collaboration, and social competence. Curriculum and instruction, therefore, play an important role in developing these competencies and aligning educational outcomes with societal and workforce needs (Mateo-Berganza Díaz et al., 2022).

Related Studies. Several international studies have examined the integration of 21st-century skills into education. In Australia, Scoular and Care (2018) noted that the focus has shifted from recognizing the importance of 21st-century skills to determining how to implement them effectively in schools. European research by Crosta et al. (2023) found that many graduates still lack essential 21st-century competencies despite curricular reforms.

In North America, Kennedy and Sundberg (2020) highlighted the importance of aligning classroom assessment and instructional practices with 21st-century learning goals. In Africa, Mitana et al. (2019) reported that employers increasingly value soft skills alongside academic competence, encouraging schools to revisit their learning outcomes and assessment practices.

Asian countries have likewise introduced curriculum reforms to strengthen these competencies. Inganah et al. (2023) observed that teachers still experience difficulties integrating 21st-century skills into instruction due to issues in planning, time management, and learner motivation.

While numerous studies have documented the importance of 21st-century skills and the challenges associated with their implementation, most investigations have focused either on teachers' instructional practices or on students' competencies independently. Limited empirical evidence exists regarding the extent to which teachers' integration efforts correspond with students' perceived proficiency in these competencies, particularly within Philippine public senior high schools. Addressing this gap may provide insights into curriculum implementation and guide the development of interventions that better align instructional practices with desired learner outcomes.

This gap highlights the need for further investigation, particularly in local contexts such as Tagbilaran City, Bohol.

Statement of the Problem. This study investigates the integration of 21st-century skills into the curricula of public senior high schools in Tagbilaran City, Bohol, during SY 2024-2025, as a basis for curriculum enhancement.

Specifically, it seeks to answer the following questions:

1. What is the extent of teachers' integration of 21st-century skills?
2. What is the level of students' proficiency?

3. Is there a significant relationship between teachers' integration of 21st-century skills and students' perceived proficiency in these skills?
4. Based on the findings, what curriculum enhancement program may be proposed?

RESEARCH METHODOLOGY

This study employed a quantitative descriptive-correlational research design to examine the integration of 21st-century skills in the curricula of selected public senior high schools in Tagbilaran City during School Year 2024–2025. The study involved five public senior high schools under the Tagbilaran City Schools Division.

Prior to data gathering, ethical clearance was secured from the University of Bohol Ethics Review Committee (REC Code 1687). Permission to conduct the study was also obtained from the appropriate school and division authorities. Ethical standards were observed throughout the study. Respondents were informed of the purpose of the research, their voluntary participation, and their right to withdraw at any stage. To maintain confidentiality, responses were coded, and no identifying information was collected.

Stratified random sampling was used in selecting the respondents. From 152 teachers, 54 were selected, while 440 students were chosen from a population of 3,234. Data were gathered using researcher-developed questionnaires composed of two parts: Part I collected respondents' profiles. At the same time, Part II assessed teachers' integration practices and students' perceived proficiency in 21st-century skills using a 4-point Likert scale.

The instruments underwent content validation by experts in curriculum development and educational measurement. Pilot testing was also conducted among selected senior high school respondents from a private institution in Tagbilaran City. Reliability testing through Cronbach's alpha showed acceptable overall internal consistency for the teachers' questionnaire ($\alpha = 0.713$) and strong reliability for the students' questionnaire ($\alpha = 0.904$).

Weighted mean and ranking were used to describe the extent of teachers' integration of 21st-century skills and students' perceived proficiency in them. Spearman's rho was utilized to determine the relationship between teachers' integration practices and students' perceived proficiency levels. Data were organized and analyzed using Microsoft Excel and SPSS.

Table 1. *Interpretation of Teachers’ Integration of 21st-Century Skills*

Scale	Range	Descriptive Rating	Interpretation
4	3.25–4.00	Strongly Agree	Highly Integrated
3	2.50–3.24	Agree	Moderately Integrated
2	1.75–2.49	Disagree	Less Integrated
1	1.00–1.74	Strongly Disagree	Not Integrated

Table 2. *Interpretation of Students’ Proficiency in 21st-Century Skills*

Scale	Range	Descriptive Rating	Interpretation
4	3.25–4.00	Strongly Agree	Highly Proficient
3	2.50–3.24	Agree	Moderately Proficient
2	1.75–2.49	Disagree	Less Proficient
1	1.00–1.74	Strongly Disagree	Not Proficient

To examine the relationship between teachers’ integration practices and students’ perceived proficiency, teacher responses were aggregated at the school level and matched with corresponding school-level mean student scores before correlation analysis was performed.

RESULTS AND DISCUSSION

Teachers generally perceived that 21st-century skills were integrated into their classroom practices across the three identified domains. In Learning and Innovation Skills, the findings suggest that teachers commonly emphasized creativity, collaboration, communication, and problem-solving in their instructional activities. The findings suggest that greater emphasis was placed on instructional activities that encouraged creativity, collaboration, and communication among learners. Even though there were fewer responses to jobs requiring complex problem-solving and planning, respondents generally reported favorable perceptions of these competencies. These findings suggest that teachers recognized the importance of fostering higher-order thinking skills among learners. This finding aligns with Nozari and Siamian’s (2014) finding that problem-solving methods may help students generate new ideas.

Teachers also reported a high level of unity regarding Information, Media, and Technology Skills. The findings indicate a greater emphasis on the responsible and ethical use of digital tools, knowledge, and resources in the classroom. Teachers also said they taught students how to judge the reliability of online sources and spot bias in the media. However, fewer people responded to tasks involving creating content and fixing technical problems, suggesting these areas may still need more work. At the same time, the results suggest that using technology in the classroom is now commonplace, especially for communication and obtaining information for schoolwork.

Teachers also perceived Life and Career Skills to be highly integrated into instruction. The results suggest that classroom activities commonly encourage interpersonal skills, leadership, accountability, and collaboration. Teachers appeared to place importance on helping students work effectively with others, demonstrate responsibility, and respond respectfully to diverse perspectives. On the other hand, responses about how to handle conflicts and adapt to new situations were not very high, suggesting that these areas could use more work. Overall, the results show that attempts have been made to help students grow personally and socially while they are also learning in school. Jacobs et al. (2022) said the same thing: intentionally incorporating life skills into lessons may help students grow socially and personally. With a total composite mean of 3.56, the summary results indicate that teachers believed 21st-century skills were highly integrated into their teaching. The three areas were rated in this order: Learning and Innovation Skills got the best score, followed by Life and Career Skills. Information, Media, and Technology Skills, on the other hand, received the lowest score but were still in the highly integrated range. Based on these results, it appears that teachers place a lot of emphasis on teaching communication, collaboration, creativity, and responsibility in the classroom. However, students may still need more help and enrichment with technology-related skills.

Table 3. *Summary on the Extent of Teachers' Integration of 21st-Century Skills*
n=54

Summary on the Extent of Teachers' Integration of 21 st -Century Skills	Composite Mean	Interpretation	Rank
Learning and Innovation Skills	3.68	Highly Integrated	1
Life and Career Skills	3.59	Highly Integrated	2
Information, Media, and Technology Skills	3.41	Highly Integrated	3
Overall COMPOSITE MEAN	3.56	Highly Integrated	

Scale	Range	Descriptive Value	Interpretation
4	3.25-4.00	Strongly Agree	Highly Integrated
3	2.50-3.24	Moderately Agree	Moderately Integrated
2	1.75-2.49	Agree	Less Integrated
1	1.00-1.74	Disagree	Not Integrated

Table 4 shows that students reported moderate proficiency and perceived themselves as able to accomplish tasks with some guidance in their capacity for learning and innovation, as reflected in the composite mean of 2.96. This result indicates that students perceived having foundational skills in learning and innovation. However, since the result is based on self-reported survey responses, it is not conclusive evidence of students' proficiency levels.

Most students rated themselves as moderately proficient in the listed 21st-century skills. The results show that students demonstrated greater confidence in the social and creative aspects of learning within the Learning and Innovation Skills. This included understanding others' points of view, communicating politely, and collaborating with peers. These answers could show that students are learning to understand and care about others in school. Students seemed less sure of themselves when they had to do tasks that required them to try new things, plan, and solve difficult problems without easy answers right away. Although fundamental skills are evident, this pattern suggests a need to further develop problem-solving and higher-order thinking skills. Tikkanen et al. (2022) found that empathy and positive peer interactions enhance students' learning and engagement.

Students reported being moderately good at Information, Media, and Technology Skills. From the answers, it looks like students know how to use online resources and digital tools for school communication. Students also knew how to behave responsibly online and how important it is to verify information they find online. Still, there was less confidence in creating material and fixing technical problems. In these areas, it may be clear that more chances are needed to learn useful, independent tech skills. The results are similar to those of Garma et al. (2024), who found that senior high school students' technological skills were still developing and needed improvement through appropriate instructional support.

For Life and Career Skills, too, students showed a middling level of skill. The results show that students valued being responsible, treating others with care, working together, and being open to different points of view. These answers show that people are becoming more aware of the personal and social skills they will need in school and in the future at work. However, students seemed less sure of their ability to self-regulate, change, handle conflicts, and finish tasks on their own. These skills are necessary for students to handle changing scenarios and take on more responsibility. The authors Nair and Fahimirad (2019) said that teaching life skills, such as conversation, leadership, and problem-solving, as part of school programs could help students grow personally and socially.

The mean score for the summary results is 3.03, indicating that the students who completed the survey were somewhat proficient in using 21st-century skills. The three areas were rated as follows: Life and Career Skills got the best score, followed by Information, Media, and Technology Skills. Learning and Innovation Skills got the lowest score. According to these results, most students believe they can use their social, interpersonal, and technical skills while learning. However, skills in critical thinking, generating new ideas, and solving complex problems may still need more work. Overall, the results show how important it is to improve classroom activities that encourage creativity, independent thinking, flexibility, and a greater interest in real-life learning tasks.

Table 4. *Summary of the Students' Proficiency in 21st-Century Skills n=440*

Summary of the Students' Proficiency in 21 st -Century Skills	Composite Mean	Interpretation	Rank
Life and Career Skills	3.08	Moderately Proficient	1
Information, Media, and Technology Skills	3.04	Moderately Proficient	2
Learning and Innovation Skills	2.96	Moderately Proficient	3
Overall COMPOSITE MEAN	3.03	Moderately Proficient	

Scale	Range	Responses	Interpretation
4	3.25-4.00	Strongly Agree	Highly Proficient
3	2.50-3.24	Moderately Agree	Moderately Proficient
2	1.75-2.49	Agree	Less Proficient
1	1.00-1.74	Disagree	Not Proficient

Table 4 reflects an overall composite mean of 3.03 on students' perceived proficiency in 21st-century skills. The collective results indicate that students perceived their proficiency in 21st-century skills as moderate. Life and Career Skills obtained the highest proficiency rating among the identified skills domains, with a composite mean of 3.08. This result suggested that students reportedly have some degree of confidence and readiness to use life and career skills in real-world and professional contexts. Information, Media, and Technology Skills followed closely, with a composite mean of 3.04, suggesting a solid grasp of digital and technological skills. Conversely, the lowest-ranked, with a composite mean score of 2.96, is Learning and Innovation Skills, indicating that the domain needs attention for improvement.

Table 5. *Correlation Between Teachers' Integration of 21st-Century Skills and Students' Perceived Proficiency*

Variables	Spearman's rho	p-value	Decision	Interpretation
Teachers' integration and students' perceived proficiency in Learning and Innovation Skills	-0.126	.364	Fail to reject H_0	Not significant
Teachers' integration and students' perceived proficiency in Information, Media, and Technology Skills	-0.124	.373	Fail to reject H_0	Not significant
Teachers' integration and students' perceived proficiency in Life and Career Skills	-0.038	.786	Fail to reject H_0	Not significant

Although the correlation coefficients were negative, their magnitudes were negligible and statistically insignificant. Therefore, the negative direction should not be interpreted as evidence of an inverse relationship but rather as an indication of the absence of a meaningful association between the variables.

The absence of statistically significant relationships suggests that students' perceived proficiency may be influenced by factors beyond teachers' reported integration practices. These factors may include prior learning experiences, access to technological resources, family support, peer interactions, motivation, and opportunities to practice 21st-century skills outside the classroom. The findings imply that the development of these competencies is a multifaceted process that extends beyond instructional integration alone.

The results show no significant association between teachers' reported use of 21st-century skills in the classroom and students' perceived proficiency across all three skill areas. The results show that teachers' approaches to integrating learning may not always align with students' perceptions of their performance. This result might reflect the impact of factors beyond classroom teaching, such as students' personal experiences, learning environments, motivation, access to technology, and opportunities to use skills outside of school.

The results may also show that teachers and students have different ideas about how to teach and learn 21st-century skills. Teachers may think these skills are built into classroom tasks, but students may judge their skill level based on their confidence and experiences in other areas. Since the study relied on people's self-reported perceptions, the results should be taken with a grain of salt and seen as possible rather than certain signs of skill growth. The results of this study are similar to those of Enriquez and Lantaka (2024), who found no significant association between teachers' 21st-century skills and students' learning outcomes. The results of their study showed that student performance and skill development may be influenced by more than how teachers teach.

LIMITATIONS OF THE STUDY

The study used self-reported data from teachers and students collected via surveys, which may have introduced response bias and limited the generalizability of the findings. Personal views, social desirability bias, or differing interpretations of the levels of integration and competency may influence the answers. The result may not fully capture teachers' integration of 21st-century skills into classroom practices, as it is more a matter of perception than of observed practices. Students might have overestimated or underestimated their proficiency in 21st-century skills. The lack of triangulation methods, such as classroom observations, lesson plan analysis, or student performance testing, also limits the depth of the data. Because of this, the data should be seen as hints rather than proof that 21st-century skills should be included.

Additionally, the study focused mostly on measures of how students thought they were doing rather than direct tests of their actual skills. So, the results reflect what the respondents thought, and they shouldn't be taken as definitive proof of how well someone actually uses 21st-century skills.

The correlation study was conducted using data from five schools, combined as a whole. There weren't many paired observations, which reduced statistical power and might have made it harder to detect important relationships.

CONCLUSIONS

Teacher respondents had high levels of self-reported integration across all the identified 21st-century skills. Learning and Innovation Skills attained the highest mean score, indicating a strong focus on creativity, collaboration, and problem-solving. Life and Career Skills came in second, indicating that teachers value teaching students social skills, leadership, initiative, and productivity to prepare them for the challenges they will face in the real world. Information, Media, and Technology Skills obtained the lowest composite mean among the three domains, although the rating remained within the highly integrated category.

The data, on the other hand, showed that students were only somewhat skilled in three areas. They thought they were better at Life and Career Skills, which showed that they were responsible, had good social skills, were proactive, and were good leaders, among other things. The fact that Information, Media, and Technology Skills came in second shows that students are pretty good at using digital tools and resources for schoolwork. The fact that Learning and Innovation Skills ranked last among the three skill areas shows that we need to encourage students to engage in more complex thinking when learning. These results make it clear that the curriculum needs to be revised to actively encourage skills such as problem-solving, communication, creativity, and critical thinking.

There was not enough data to show a statistically significant association between how teachers reported integrating 21st-century skills and how well students thought they knew them. Teachers thought there was extensive integration across the listed domains, but students reported being only moderately proficient. Given this difference, it seems that teaching 21st-century skills might not always make students feel competent. This could be due to various personal, social, and teaching factors. The results also show that the senior high school program needs to include more comprehensive methods for teaching and assessing 21st-century skills.

RECOMMENDATIONS

The researcher proposes enhancing the Senior High School Curriculum in DepEd Tagbilaran City to address the identified gaps in the research

findings and conclusions. To address the gap, the curriculum should include the following enhancements.

1. Targeted support and capacity building to strengthen teachers' skills in integrating Information, Media, and Technology Skills. Training programs and workshops should focus on technical skills and pedagogical approaches in integrating digital tools in teaching practices.
2. Embed Learning and Innovation Skills across subjects. Curriculum guides must intentionally incorporate activities that encourage creativity, critical thinking, problem-solving, and collaboration, among others, in every subject area.
3. Utilize performance-based and project-based learning in major performance tasks. The assessment tasks should require students to demonstrate real-world problem-solving, creativity, collaboration, and the use of information and technology. Requiring students to solve problems, collaborate with peers, use technology, and be creative will ensure the practical applications of 21st-century skills.
4. Establish a student feedback mechanism on classroom instruction, particularly in integrating 21st-century skills. A structured feedback system will help bridge the perceptual gap between teachers' self-reported integration and students' perceived proficiency in 21st-century skills.
5. Future studies may employ classroom observations, portfolio assessments, and performance-based evaluations to validate self-reported measures of 21st-century skills.

REFERENCES CITED

- Alismail, H. A., & McGuire, P. (2015). 21st-century standards and curriculum: Current research and practice. *Journal of Education and Practice*, 6(6), 150–155. <https://eric.ed.gov/?id=EJ1083656>.
- Alshammari, A. E., & Thomran, M. (2023). Towards enhancing creativity and innovation in the education system for youth in the Hail region. *Advanced Education*, 22, 122–136. <https://doi.org/10.20535/2410-8286.279776>.
- Crosta, L., Banda, V., & Bakay, E. (2023). 21st-century skills development among young graduates: A European perspective. *GiLE Journal of Skills Development*, 3(1), 40–56. <https://doi.org/10.52398/gjsd.2023.v3.i1.pp40-56>.

- Dewey, J. (1938). *Experience and education*. Macmillan. <https://doi.org/10.1080/00131728609335764>.
- Drake, S. M., & Reid, J. L. (2020). 21st-century competencies in light of the history of integrated curriculum. *Frontiers in Education*, 5, Article 122. <https://doi.org/10.3389/feduc.2020.00122>.
- Enriquez, R. M. A., & Lantaka, I. A. (2024). Teachers' 21st-century skills and pupils' learning outcomes: Basis for the training program. *Journal of Emerging Technologies and Innovative Research*, 11(6), 284-290 <https://www.jetir.org/papers/JETIR2406137.pdf>.
- Garma, J. C., Ihalon, E. C., & Gador, S. C. (2024). Technological proficiency of senior high school students through the lens of digital education. *Psychology and Education: A Multidisciplinary Journal*, 26(1), 41-46. <https://doi.org/10.5281/zenodo.13886189>
- Inganah, S., Darmayanti, R., & Rizki, N. (2023). Problems, solutions, and expectations: 6C integration of 21st-century education into learning mathematics. *JEMS: Jurnal Edukasi Matematika dan Sains*, 11(1), 220-238. <https://doi.org/10.25273/jems.v11i1.14646>
- Jacobs, J. M., Wright, P. M., & Richards, K. A. R. (2022). Students' perceptions of learning life skills through the Teaching Personal and Social Responsibility model: An exploratory study. *Frontiers in Sports and Active Living*, 4, 898738. <https://doi.org/10.3389/fspor.2022.898738>
- Kennedy, T.J., & Sundberg, C.W. (2020). 21st Century Skills. In: Akpan, B., Kennedy, T.J. (Eds), *Science education in theory and practice* (pp 479-496). Springer. https://doi.org/10.1007/978-3-030-43620-9_32
- Le, S. K., Hlaing, S. N., & Ya, K. Z. (2022). 21st-century competences and learning in technical and vocational training. *Journal of Engineering Researcher and Lecturer*, 1(1), 1-6. <https://jerel.riksociety.org/index.php/jerel/article/view/4>

- Mateo-Berganza Díaz, M. M., Lim, J. R., Pellicer Iborra, C., López, E., Rodríguez, H., López, R., Magro Mazo, C., Vásquez Guerra, A., Quesada Alvarado, A., Brooks-Young, S., Álvarez, X., Ramos, Y., Rivas, A., Barrenechea, I., Brazão, V., Ndebele, V., Nathan, D., & Groot, B. (2022). *The power of curriculum to transform education: How education systems incorporate 21st-century skills to prepare students for today's challenges*. <https://doi.org/10.18235/0004360>
- Mitana, J. M. V., Muwagga, A. M., Giacomazzi, M., Kizito, O. S., & Ariapa, M. (2019). Assessing educational outcomes in the 21st century in Uganda: A focus on soft skills. *Journal of Emerging Trends in Educational Research and Policy Studies*, 10(1), 62–70. <https://hdl.handle.net/10520/EJC-17aa80fc14>
- Nair, P. K., & Fahimirad, M. (2019). A qualitative research study on the importance of life skills for undergraduate students' personal and social competencies. *International Journal of Higher Education*, 8(5), 71–83. <https://doi.org/10.5430/ijhe.v8n5p71>
- Nozari, A. Y., & Siamian, H. (2014). The effects of problem-solving teaching on creative thinking among District 2 high school students in Sari City. *Materia Socio Medica*, 26(6), 360–363. <https://doi.org/10.5455/msm.2014.26.360-363>
- Organisation for Economic Co-operation and Development. (2018). *The future of education and skills: Education 2030*. OECD Publishing. <https://www.oecd.org/education/2030-project/>
- Republic of the Philippines. (2013). *Republic Act No. 10533: Enhanced Basic Education Act of 2013*. Official Gazette. <https://www.officialgazette.gov.ph/2013/05/15/republic-act-no-10533/>
- Republic of the Philippines. (2018). *Republic Act No. 10968: Philippine Qualifications Framework Act*. Official Gazette. <https://www.officialgazette.gov.ph/2018/01/16/republic-act-no-10968/>
- Rizaldi, D. R., Nurhayati, E., & Fatimah, Z. (2020). The correlation between digital literacy and STEM integration in improving Indonesian students' skills in the 21st century. *International Journal of Asian Education*, 1(2), 73–80. <https://doi.org/10.46966/ijae.v1i2.36>

- Scoular, C., & Care, E. (2018). Teaching Twenty-First Century Skills: Implications at System Levels in Australia. In: Care, E., Griffin, P., Wilson, M. (eds) *Assessment and Teaching of 21st Century Skills. Educational Assessment in an Information Age*. Springer, Cham. https://doi.org/10.1007/978-3-319-65368-6_9
- Tikkanen, L., Anttila, H., Pyhältö, K., Soini, T., & Pietarinen, J. (2022). The role of empathy between peers in upper secondary students' study engagement and burnout. *Frontiers in Psychology*, 13, 978546. <https://doi.org/10.3389/fpsyg.2022.978546>
- United Nations. (2016). *Sustainable Development Goal 4: Quality education*. United Nations Sustainable Development Goals. <https://sdgs.un.org/goals/goal4>
- Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of the 21st century. *Journal of Computer Assisted Learning*, 29(5), 403–413. <https://doi.org/10.1111/jcal.12029>