Teachers with Participatory Action to Enhance 21st Century Learner Skills

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Abstract

This research aimed to enhance the 21st-century skills of students at Sarakulnawitaya School by focusing on communication skills, creativity, critical thinking, and collaboration. The research methodology was Participatory Action Research. The objectives of the research were threefold: 1) change occurred, 2) learning developed, and 3) knowledge gained from practical experience. The research involved 20 teachers as co-researchers and 50 students. The results of this study compared the average performance across three phases: before and after the implementation of *Cycle 1*, and after the implementation of *Cycle 2*. The findings indicated that: 1) The implementation of 55 predetermined strategies for enhancing learners' skills in the 21st century resulted in the increase of the average scores from 2.42 to 2.74 and 3.02, respectively, while students' communication, creativity, and analytical thinking, and teamwork skills improved as reflected in their average scores of 2.46, 2.77, and 3.06. 2) The research team, participants, and educational institution gained knowledge and learning from the various implementation phases, particularly in terms of team awareness, mutual assistance, systematic problem-solving, and collaboration. 3) The research yielded valuable insights into the relationship between driving forces that hinder change, methods for overcoming resistance, and the resulting changes. This knowledge is referred to as the "Teacher-Involved Model for Enhancing 21st-Century Learner Skills in Sarakulnawitaya School."

Keywords: 21st-century learner skills, creative skills, critical thinking and collaboration skills, participatory action research methodology, Sarakulnawitaya school

1. Introduction

Holland (2015) offers valuable insights into the contemporary state of society, highlighting the importance of developing 21st-century skills. The 21st century is marked by the convergence of the Information Age and the Knowledge Economy, spanning the period from January 1, 2000, to December 31, 2099. The Information Age is propelled by the knowledge economy, which prizes problem-solving and critical-thinking abilities over the mechanical skills that characterized the Industrial Era. Although the 21st century may encompass additional ages and economies that have yet to emerge, teachers must facilitate the acquisition of critical thinking, creativity, communication, and collaboration skills among students to enable them to thrive in the workforce. To this end, teachers must embrace a shift in classroom practices that aligns with the demands of the 21st century.

According to Buckle (n.d.), 21st-century skills encompass a range of knowledge, life skills, career skills, habits, and traits that are crucial for student success in college, the workforce, and adult life. The prioritization of specific 21st-century skills varies among districts, schools, and organizations depending on their respective communities. Nevertheless, it is widely recognized among educators that these skills should be incorporated into learning experiences and common core instruction. Some of the most commonly cited 21st-century skills include critical thinking, creativity, collaboration, communication, information literacy, media literacy, technology literacy, flexibility, leadership, initiative, productivity, and social skills, as they are necessary for keeping up with the fast-paced modern markets. Stauffer (2022) further argues that these skills share a common quality, which is their importance in the age of the Internet.

Vaden (2020) discusses the significance of teaching 21st-century skills in schools, as these skills provide a

foundation for successful learning in school, they also help to ensure students are successful outside of the classroom, in real-world scenarios in life, and in future workplaces where change is inevitable. Similarly, Ross (2017) argues that in this globally and digitally interconnected world, all learners, from cradle to career, need new skills and knowledge to succeed. if we want to prepare our children for success in school, work, and life, opportunities to learn 21st-century skills are essential.

In a globally and digitally interconnected world, the importance of developing 21st-century skills for learners has led to various proposed approaches. Oxford University Press (2013) suggested five ways to prepare students for the 21st century, which include letting students lead their own learning, creating an inquiry-based classroom environment, encouraging collaboration, developing critical thinking skills, and promoting creativity. Similarly, Wagner (2019) recommended a four-step process for developing 21st-century skills in students, which involves creating an authentic project or assignment, identifying relevant skills, assessing these skills multiple times, and allowing for student reflection. Moreover, even the assessment of 21st-century skills has been subject to proposed replacement thinking, with Fisher (n.d.) offering four considerations, namely, students demonstrating what they have learned, demonstrating content proficiency and sophistication, frequently reflecting on their choices, and giving credit where credit is due.

Therefore, it is evident that in the 21st century, the development of 21st Century Skills is crucial for students to succeed in learning and future workplaces, as a result of being in the information age and rapid adoption of new technologies. This has led to a variety of suggestions for developing these skills from different countries. This article serves as a descriptive text to provide an overview of this concept. Consequently, the research team was inspired to conduct the project entitled "Teachers with Participatory Action to Enhance 21st Century Learner Skills" in Sarakulnawitaya school, where researcher 1 is a teacher there. The research commenced by conducting a thorough examination of the diverse issues that were presented on the internet, as outlined in the literature review. A participatory action research methodology was employed by the researchers with the expectation of achieving favorable results. This research methodology was selected since it was designed to elicit transformation through democratic participation and collaborative efforts, adopting a bottom-up approach. The research endeavor was a joint effort between the researchers and participants, with a focus on equality throughout the Planning, Acting, Observing, and Reflecting (PAOR) stages of the research. This process adopted a spiral cycle, continually progressing without cessation.

1.1 Research Objective

The objective of this research is to contribute to the Teachers with Participatory Action to Enhance 21st Century Learner Skills project at Sarakulnawitaya School. The study focuses on developing four key skills - communication, creativity, critical thinking, and collaboration skills - using Participatory Action Research (PAR) methodology. The objective of this research is to emphasize the importance of studying academic literature related to enhancing 21st-century learner skills as explicit knowledge, which covers a diverse range of issues and perspectives. This preliminary study is aimed at obtaining explicit knowledge that can be combined with tacit knowledge obtained from the experiences of the research participants, to develop a more comprehensive understanding. This aligns with the principle that "theory and practice should be interwoven, and for this reason, it is useful to think of the process as braiding a rope where the two aspects are continually connected" (Flinders University, 2022). This research involves a team of 20 teachers and 50 students who are participating in a development program. The expected outcomes of this program include: 1) changes, both expected and unexpected, resulting from the program, 2) learning that arises from the practical experiences of the research team, participants, and the educational institution, and 3) knowledge that serves as a lesson learned from the practical implementation, highlighting the relationship between the outcomes of the program, the driving forces behind the change, resistance to change, and the methods used to overcome obstacles to change.

1.2 Literature Review

Following the research objectives, which emphasize the importance of studying academic literature to gain explicit knowledge about enhancing 21st-century learner skills across diverse issues and perspectives, the research team examined academic perspectives on communication skills, creativity skills, critical thinking skills, and collaboration skills in six areas: 1) Definition from the perspectives of Glen Ellyn School District (n.d.), Hogue (2011), IGI Global (n.d.), NT Christian Schools (2018), and South Africa Today (2017). 2) Importance from the perspectives of Aggarwal (2019), Canvas in Structure (n.d.), Gill (2020), Life Skills Group (2019), and Teach Thought Staff (n.d.) 3) Characteristics from the perspectives of Breed (2019), Eaton (2011), Envision (n.d.), Haroon (2017), Jones (n.d.), Life Skills Group (2019), Nichols (n.d.), Oxford University Press ELT (2013), Sriraman (n.d.), and Wabisabi

Learning (n.d.) 4) Developmental approaches from the perspectives of Abazov (2021), Bachrach. (2019), Collaborative Outcomes (n.d.), Dsouza (n.d.), Edublox Online Tutor (2017), Garfinkle ((n.d.), Half (2018), Indeed (2020), Indeed. (2021), Jones (n.d.), Kim (2021), Master Class (2021a), Patel (2019), Patterson (2020), Payne (n.d.), Peshev (2020), Rasmussen University (2020), Sindell and Sindell (2014), Wells (2018), and Zwilling (2012) 5) Development process from the perspectives of Elmansy (2016), Indeed (2020), Kavanaugh (2018), Master Class (2021b), Mistry (2020), Moreo (n.d.), Summer (n.d.), and Taylor (n.d.) 6) Assessment from the perspectives of Educators Technology (2015), Mojecosie (2011), Pinterest.fr (n.d.), Ravitz (2014), and Sean (n.d.)

Based on the literature review on the six topics, the research team identified a range of perspectives related to principle-based approaches, concepts, techniques, methods, or activities as explicit knowledge that is crucial for enhancing 21st-century learner skills. These perspectives provide important insights into diverse development approaches. The team synthesized 50 development approaches, as follows:

1) Make communication a priority
2) Focus on nonverbal communication
3) Be a listener
4) Recognize problems in communication
5) Keep it positive
6) Embrace chang
7) Develop foresight
8) Be open-minded
9) Do something outside your comfort zone
10) Think of an improvement
11) Think of new ideas
12) Participate in team-building activities
13) Build and maintain trust
14) Create learning experiences
15) Create a culture of communication
16) Practice active listening
17) Ask for honest feedback
18) Get comfortable speaking extemporaneously
19) Practice dreaming
20) Reframe your way of thinking
21) Ask a lot of questions
22) Consider how the topics connect
23) Consider the pros and cons
24) Analyze failures and mistakes
25) Master the art of timing
26) Enhance their reading comprehension skills
27) Decision making
28) Provide recognition and rewards
29) Find a mentor
30) Develop your listening skills
31) Learn through collaboration
32) Collaborative team relationships
33) Speak clearly and concisely
34) Make time for cohesive creative thinking
35) Do something you love
36) Evaluate existing evidence
37) Reflection

38) Set clear expectations
39) Overcome challenges and solve problems without assigning blame
40) Treat mistakes as feedback
41) Practice public speaking
42) Learn to pitch ideas
43) Bounce ideas off others
44) Debate
45) Brainstorm ideas
46) Mind maps
47) Roleplay
48) Consider tried and tested method vs out of the box solutions
49) Riddles
50) Clear roles, responsibilities, and goals.

2. Research Methodology

2.1 Level and Format of PAR in This Study

Carr and Kemmis (1992) classified action research into three distinct tiers: (1) Technical Action Research, characterized by the researcher's role as an external specialist who offers ideas, plans, or projects for the research participants to enact; (2) Practical Action Research, distinguished by the researcher's increased collaboration with the research participants, serving as a consultant, facilitator, and guide for collaborative thinking, practicing, observing, and reflecting; and (3) Emancipatory Action Research, also referred to as Participatory Action Research, involving a collaborative and equitable partnership between the researcher and the research participants.

This study utilized the Participatory Action Research (PAR) methodology, based on the analytical and synthetic findings of Sanrattana (2018) and the works of Arhar, Holly, and Kasten (2001), Carr and Kemmis (1992), Coghlan and Brannick (2007), Creswell (2008), James et al. (2008), Kemmis and McTaggart (1992), McTaggart (1991), McTaggart (2010), and Mills (2007). It was found that PAR methodology is a research process that aligns with the critical social science or pragmatism theory, utilizing scientific methods to an extent while incorporating a participatory action approach between researchers and research participants in a collaborative and equal manner, following the Planning, Acting, Observing, and Reflecting (PAOR) cycle in a never-ending spiral to continuously improve practices and the quality of life.

2.2 Principles, Code of Conduct, and Roles

The PAR methodology employed in this study upholds a set of 10 principles as follows: 1) it involves a specific context, with attention paid to the particular circumstances of the research. 2) it emphasizes the importance of diverse skills, recognizing that a range of expertise is necessary for effective collaboration. 3) the PAR methodology aims for change, intending to transform existing conditions. 4) it is action-oriented, with an emphasis on achieving tangible results. 5) it values the input of all research participants, ensuring that their voices are heard. 6) it involves an ongoing process of analysis, interpretation, and self-evaluation, with a view to continuous improvement. 7) it recognizes the potential, expertise, and involvement of community members, valuing their contributions to the research process. 8) it recognizes that learning can occur from both successful and unsuccessful actions, creating a systematic learning process. 9) it records the contributions of all research participants, ensuring that their contributions are recognized and valued. 10), it aims to lead to sustainable practices or developments, with a view to long-term impact.

To ensure ethical conduct in this research, the following 10 principles are adhered to: 1) maintaining the confidentiality and being accountable for it, 2) providing equal access to information for all participants involved in the research, 3) making collaborative decisions regarding research direction and outcomes, 4) ensuring maximal participation of all researchers in designing the research process, 5) seeking consultation and approval of ideas from all parties involved, 6) obtaining permission before analyzing or examining documents for alternative purposes, 7) maintaining transparency in displaying progress and inviting feedback from others, 8) avoiding infringing on copyrights or the opinions of others, 9) disclosing the nature of the research process from the outset, and 10) acknowledging and respecting the influence and convenience of all research participants, even those who choose not

to participate.

The researcher's role is governed by 10 principles, which are: 1) being a teacher, 2) being a leader, 3) being an attentive listener, 4) being a planner, 5) being a designer, 6) being an analyst, 7) being a synthesizer, 8) being an observer, 9) being a reporter, and 10) being a promoter and facilitator.

2.3 Cycles, Steps, and Activities

The PAR methodology is a research approach that employs a participatory action model, promoting collaboration between researchers and participants who share an equal status throughout the Planning, Acting, Observing, and Reflecting (PAOR) process, which is carried out in a continuous spiral cycle. However, given the time constraints dictated by the curriculum, the research team has decided to limit this study to two cycles, each lasting for a semester, within the 2022 academic year. The research will be conducted in each cycle, with each stage carefully followed, as detailed below:

Cycle *1*

Step 1: Preparation It consists of three activities: 1) researchers must explain the research process to ensure that the research participants have informed consent and participate voluntarily, in line with ethical standards: *"Researchers must inform research participants of the nature of the research process and its benefits from the outset, and individuals who choose not to participate must be accepted and respected in their rights."* 2) the collaborative working approach should be co-designed under ethical principles: *"Research participants should be involved in the design of the research process, and there should be consultation and agreement on proposals and suggestions from all parties involved."* 3) extracting lessons learned, according to the principles of *"analysis, interpretation, self-evaluation, and learning from both successful and unsuccessful experiences, resulting in a systemic process of shared learning."*

Step 2, Planning It is comprised of four distinct activities: 1) collaborative brainstorming with research participants to determine how to enhance 21st-century learner skills of students at Sarakulnawitaya School, with a particular focus on communication, creativity, critical thinking, and collaboration skills. This activity follows the principles of *"acknowledging the potential, expertise, and participation of the research participants."* 2) the research team presents explicit knowledge frameworks derived from relevant literature studies to ensure that all research participants have equal access to information. 3) creation of an Action Plan by synthesizing "Tacit knowledge + Explicit knowledge," following the principles of "listening to the opinions of all research participants," and according to ethical principles of *"consultation and agreement on proposals and suggestions from all parties involved."* The outcome of this activity is a principled development framework, concepts, techniques, methods, or activities comprising 55 strategies (as shown in Table 1). 4) extraction of lessons learned based on the aforementioned principles.

Step 3, Acting It comprises four activities. Firstly, developing two assessment tools: the first to evaluate the level of participation of the research participants and the second to evaluate the 21st-century learner skills of Sarakulnawitaya School students. These tools will be used for evaluation at three stages: before and after the first cycle and after the second cycle of implementation. This is by the ethical principle of "*decision-making together"* for research direction and expected results. Secondly, assessing the current state of affairs before the first cycle of implementation, using the same assessment tools as above. Thirdly, implementing the action plan based on the principle of "*context-specific, diverse skills, action-oriented, and sustainable development,"* while adhering to ethical principles of *"influence of all research participants."* Fourthly, extracting lessons learned based on the aforementioned principles.

Step 4, Observing, involves collecting data from the implemented activities through observation, in-depth interviews, group discussions, and examining/recording journals, maps, audio and video recordings, artifacts, field notes, etc. This is under the ethical principle of "recording by all research participants about the activities and implementation," while ensuring that observation or inspection of documents for other purposes is authorized beforehand.

Step 5, Reflecting, consists of three activities: 1) Evaluating to inform the post-implementation status in cycle 1 using a research participant performance assessment and a 21st-century learner skills assessment. 2) Reflecting on the work performed by bringing brains together to reflect on the outcomes of each stage in cycle 1 using Kurt Lewin's Force-Field Analysis technique (Lunenburg & Ornstein, 2000) to identify the driving forces that lead to change, the extent to which they are expected to result in change, the opposing forces to change, and any recommended strategies to increase the effectiveness of the driving forces or reduce the opposing forces. This is in line with the principle of "listening to everyone's opinions, analyzing, interpreting, and self-evaluating, learning from

both successes and failures and creating a systemic learning process." And under the ethical principle that "*the outcomes of the work will continue to be visible and open to opportunities for others to provide suggestions."* 3) Extracting lessons learned based on the aforementioned principles.

Cycle *2*

Step 6, Planning, is comprised of two distinct activities: Developing an action plan and extracting lessons learned.

Step 7, Acting, in a similar vein, involves two activities, namely, implementing the action plan and extracting lessons learned.

Step 8, Observing, data is gathered from different activities through the use of observation, deep or group interviews, checklists, or recording (Examining/Record), as was done in Cycle 1.

Step 9, Reflecting, encompasses three activities: assessing the performance level of the research participants and the 21st-century learner skills of the students, reflecting on work performance through brainstorming, and extracting lessons learned.

Finally, Step 10 involves summarizing the joint research findings by bringing the results of observations, interviews, inspections, recordings, evaluations, lesson transcripts. Including the reflection of the results in step 5 and step 9 came together in a seminar between the research team and the research participants. In order for the research results to be validated by the research participants in a manner known as Member Checks according to Creswell (2008), Willis (2007), Locke (2001), Leedy and Ormrod (2001) and according to the principle of *"specific context, listening to comments from all research participants, analyzing, interpreting, and self-evaluating, learning from actions, both successful and unsuccessful, leading to a systematic learning process."* Moreover, it is essential to adhere to ethical principles such as "*consultation and mutual agreement from all parties"* and *"the results of the work will still be visible and open to opportunities for others to provide suggestions."*

2.4 Research Site and Research Participants

The research area was specified based on convenience, the potential of the research team, and voluntary cooperation from the research participants. Specifically, the research was conducted at Sarakulnawitaya School, with 20 teachers involved in the research and 50 students participating in the development.

2.5 Research Tools

- Research tools for collecting high-quality data from various stages of activities were selected by the research team based on the appropriateness and situational factors, following the ideas proposed by Mills (2007), which include: 1) an observation form, 2) in-depth interviews and group discussions, and 3) examination/record or journal, maps, audiotapes and videotapes, artifacts, field notes, etc.

- The researcher and participant evaluation questionnaires were developed to enable research participants to assess themselves in terms of their ability to implement alternative proposals in three stages: before and after implementation in the first cycle, and after implementation in the second cycle. This questionnaire consists of a 5-rating scale: the most, very, neutral, a little, and the least. Content validity was not examined using item-objective congruence indexes (IOC), and the alpha coefficient of reliability was not determined through a try-out with a sample group due to the questionnaire's development as a "shared vision" of the research team and participants. This was based on the results of brainstorming for the "Tacit knowledge + Explicit knowledge" integration during the planning stage of the first cycle.

- The 21st-century learner skills assessment questionnaire for students was developed collaboratively by the research team and participants, based on the results of studies on communication skills, creativity skills, critical thinking skills, and collaboration skills from various perspectives proposed by Breed (2019), Eaton (2011), Envision ((n.d.), Haroon (2017), Jones (n.d.), Life Skills Group (2019), Nichols (n.d.), Oxford University Press ELT (2013), Sriraman (n.d.), and Wabisabi Learning (n.d.). Additionally, assessment ideas from Educators Technology (2015), Mojecosie (2011), Pinterest.fr (n.d.), Ravitz (2014), and Sean (n.d.) were also considered. This assessment questionnaire consists of 31 questions and utilizes a 5-rating scale: the most, very, neutral, a little, and the least.

This assessment was reviewed to determine the Indexes of Item-Objective Congruence (IOC) according to Rovinelli and Hambleton's (1977) perspective by five qualified experts in Educational Administration and Educational Measurement and Assessment. They found that all items in the questionnaire exceeded the designated criterion of IOC, which was 0.50. This indicates that the questions in this assessment are congruent with the developmental objectives as specified by Chaichanawirote and Vantum (2017). Subsequently, the assessment was subjected to a try-out in another non-research setting, a school, with a sample group of 30 students, to determine the reliability

coefficient using Cronbach's alpha. The overall reliability coefficient was found to be 0.96, which suggests the high internal consistency of the items. When analyzed by dimension, the critical thinking skills, creative thinking skills, communication skills, and collaboration skills subscales showed reliability coefficients of 0.82, 0.81, 0.85, and 0.81, respectively. Comparing the reliability coefficient to the criterion of 0.70 or higher, as set by UCLA's Statistical Consulting Group (2016), it was found that the values exceeded the designated criterion, indicating relatively high internal consistency of the items.

2.6 Data Collection and Analysis

In conducting research, both researcher and co-researchers are responsible for data collection throughout every stage, utilizing various tools and adhering to the principle of *"recording by all researchers about activities and practices."* Quantitative data from both versions of the self-assessment questionnaire were subjected to Descriptive Statistics, including Mean ($\bar{x}$) and Standard Deviation (S.D.). Qualitative data, which is obtained from observations, interviews, and recordings, underwent a data analysis process involving three key steps: 1) checking the completeness of the data based on the intended objectives, 2) verifying the credibility of the data by comparing the results recorded by each person and comparing the results from different data collection methods, and 3) presenting the data in a comprehensive and analytical narrative format that reflects an impartial and authentic story supported by evidence such as statistics, tables, graphics, photographs, and direct speech or unedited dialogues from the data provider, which reveal diverse feelings and thoughts on the same topic that may support or contradict each other.

3. Results of the Study

The research results are presented in line with the research objectives, which are as follows: 1) The changes that occurred, whether expected or not. The expected changes were assessed based on the self-assessment results of the co-researchers concerning the implementation level of alternative proposals and the 21st-century learner skills of students, compared across three periods: before and after the practice in the experimental group and the control group. The unexpected changes were also recorded and analyzed. 2) The effectiveness of the proposed model in enhancing the 21st-century learner skills of students, which was evaluated using pre-and post-tests and analyzed using inferential statistics. 3) The perceptions of students and teachers towards the model and its impact, were gathered through interviews and analyzed using content analysis.

3.1 Expected Changes

3.1.1 The Researchers have a Higher Level of Practice than before

The expected changes were evaluated based on the co-researchers' self-assessment results regarding their level of practice. The assessments were carried out across three stages: before and after the practice in the first cycle and after the practice in the second cycle. The results showed a significant improvement in the level of practice, as indicated by the increasing means of 2.70, 3.00, and 3.20, respectively. The standard deviations were also found to be relatively low, with values of 0.47, 0.56, and 0.52, respectively, as evidenced by the data analysis presented in Table 1.

Table 1. Comparison of the Self-assessment Results of the Researchers Regarding Their Level of Performance across Three Periods: before and after the Practice in the First Cycle, and after the Practice in the Second Cycle

The approaches to enhancing 21st-century learner skills that the research participants are anticipated to implement.	Before Cycle 1		After Cycle 1		After Cycle 2	
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
• Thinking outside the box	2.30	0.47	2.70	0.66	3.10	0.55
• Thinking rationale	2.30	0.47	2.70	0.73	3.15	0.67
• Being expressive	2.80	0.41	3.00	0.65	3.35	0.49
• Using technology to solve problems	2.70	0.47	3.00	0.56	3.25	0.44
• Creating mind maps	2.70	0.47	2.70	0.47	3.05	0.51
• Thinking positive	2.40	0.50	2.65	0.49	3.00	0.46
• Making communication a priority	2.10	0.31	2.60	0.50	3.00	0.32
• Focus on nonverbal communication	2.30	0.47	2.65	0.49	3.05	0.39
• Being a listener	2.30	0.47	2.75	0.44	3.05	0.22
• Recognizing Problems in Communication	2.10	0.31	2.60	0.50	3.10	0.31
• Keeping it positive	2.10	0.31	2.60	0.50	2.85	0.37

The approaches to enhancing 21st-century learner skills that the research participants are anticipated to implement.	Before Cycle 1		After Cycle 1		After Cycle 2	
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
• Embracing change	2.70	0.47	3.00	0.56	3.20	0.52
• Developing foresight	2.70	0.47	2.70	0.47	2.85	0.49
• Being open-minded	2.90	0.31	2.90	0.31	3.10	0.45
• Doing something outside your comfort zone	2.80	0.41	2.80	0.41	2.95	0.22
• Thinking of an improvement	2.30	0.47	2.75	0.44	2.90	0.31
• Thinking of new ideas	2.10	0.55	2.70	0.47	3.00	0.32
• Participating in team-building activities	2.10	0.45	2.55	0.51	2.90	0.45
• Building and maintaining trust	2.20	0.41	2.70	0.47	2.95	0.22
• Creating learning experiences	2.60	0.50	2.60	0.50	2.85	0.49
• Creating a culture of communication	2.95	0.51	2.95	0.51	3.15	0.49
• Practicing active listening	2.70	0.47	2.70	0.47	2.85	0.49
• Asking for honest feedback	2.40	0.50	2.40	0.50	2.65	0.59
• Being comfortable speaking extemporaneously	2.20	0.41	2.75	0.44	2.95	0.22
• Practicing dreaming	2.15	0.37	2.80	0.41	3.00	0.00
• Reframing your way of thinking	2.30	0.47	2.80	0.41	2.95	0.22
• Asking a lot of questions	2.30	0.47	2.90	0.31	3.00	0.00
• Considering how the topics connect	2.10	0.31	2.80	0.41	3.00	0.00
• Considering the pros and cons	2.70	0.47	2.70	0.47	3.05	0.51
• Analyzing failures and mistakes	2.70	0.47	2.70	0.47	3.05	0.51
• Mastering the art of timing	2.30	0.47	2.80	0.41	3.00	0.32
• Enhancing their reading comprehension skills	2.60	0.50	2.60	0.50	2.80	0.52
• Decision making	2.60	0.50	2.60	0.50	3.25	0.44
• Providing recognition and rewards	2.10	0.31	2.70	0.47	3.00	0.32
• Finding a mentor	2.40	0.50	2.70	0.47	3.10	0.45
• Developing listening skills	2.40	0.50	2.85	0.37	3.05	0.22
• Learning Through Collaboration	2.30	0.47	2.85	0.37	3.05	0.22
• Collaborative Team Relationships	2.60	0.50	2.95	0.22	3.15	0.37
• Speaking Clearly and Concisely	2.60	0.50	2.90	0.31	3.00	0.00
• Making time for cohesive creative thinking	2.28	0.44	2.75	0.38	3.00	0.24
• Doing Something You Love	2.30	0.46	2.74	0.44	3.09	0.31
• Evaluating existing evidence	2.31	0.49	2.83	0.43	3.08	0.22
• Reflection	2.33	0.51	2.92	0.40	3.26	0.38
• Setting clear expectations	2.42	0.07	2.74	0.12	3.02	0.17
• Overcoming challenges and solving problems without assigning blame	2.30	0.47	2.70	0.66	3.10	0.55
• Treating mistakes as feedback	2.30	0.47	2.70	0.73	3.15	0.67
• Practicing public speaking	2.80	0.41	3.00	0.65	3.35	0.49
• Learning to pitch your ideas	2.70	0.47	3.00	0.56	3.25	0.44
• Bouncing ideas off others	2.70	0.47	2.70	0.47	3.05	0.51
• Debating	2.40	0.50	2.65	0.49	3.00	0.46
• Brainstorming Ideas	2.10	0.31	2.60	0.50	3.00	0.32
• Roleplaying	2.30	0.47	2.65	0.49	3.05	0.39
• Considering tried and tested methods vs out of the box solutions	2.30	0.47	2.75	0.44	3.05	0.22
• Riddles	2.10	0.31	2.60	0.50	3.10	0.31
• Clear roles, responsibilities, and goals	2.10	0.31	2.60	0.50	2.85	0.37
Total	2.70	0.47	3.00	0.56	3.20	0.52

3.1.2 The Expectation for Students to Have Higher 21st-century Learner Skills

There were positive changes in assessment results, as evidenced by an increase in mean values over time. Specifically, the mean increased from 2.46 before the first cycle of implementation to 2.77 after the first cycle, and further to 3.06 after the second cycle. Additionally, the standard deviation remained consistently low with values of 0.14, 0.16, and 0.14 observed in each respective cycle, as indicated by the results of the analysis presented in Table

2.

Table 2. Comparison of the Results of Assessing 21st-century Learner Skills among Students across Three Periods: before and after the First Cycle of Implementation, and after the Second Cycle of Implementation

The expected skills	Before Cycle 1		After Cycle 1		After Cycle 2	
	$\bar{x}$	S.D.	$\bar{x}$	S.D.	$\bar{x}$	S.D.
Critical thinking skills	**2.46**	**0.17**	**2.88**	**0.16**	**3.15**	**0.12**
• Placing importance on a reasoning process.	2.40	0.64	2.86	0.35	3.32	0.47
• Having the ability to make decisions and draw conclusions based on one's thinking.	2.28	0.45	2.92	0.27	3.16	0.47
• Having the ability to analyze and evaluate the main alternatives.	2.36	0.56	2.92	0.27	3.10	0.42
• Considering possible outcomes before taking action.	2.44	0.73	2.64	0.69	3.26	0.66
• Solving complex problems.	2.58	0.76	2.98	0.32	3.00	0.29
• Establishing a connection between information and arguments.	2.64	0.78	2.90	0.30	3.06	0.47
• Developing opinions based on supporting evidence or reasoning.	2.84	0.42	2.98	0.14	3.14	0.35
• Solving problems using innovative approaches.	2.12	0.33	2.86	0.35	3.14	0.35
Creative thinking skills	**2.43**	**0.15**	**2.81**	**0.12**	**3.02**	**0.08**
• Placing importance on the process of reasoning and seeking new ideas.	2.38	0.57	2.82	0.52	3.12	0.69
• Enjoy generating new ideas and approaches to problem-solving.	2.44	0.64	2.64	0.48	2.92	0.60
• Practicing independent thinking without limitations.	2.42	0.61	2.50	0.61	2.74	0.75
• Asking questions to teachers and classmates.	2.12	0.33	2.74	0.44	2.90	0.61
• Enjoy finding new ways to deal with current problems.	2.70	0.76	3.28	0.70	3.30	0.68
• Can integrate new ideas with existing ones.	2.26	0.44	2.82	0.39	2.96	0.53
• Prefer learning through various activities rather than sitting still at a desk.	2.84	0.37	2.84	0.37	3.20	0.57
• Believes that creativity can be developed and is not an inherent trait.	2.30	0.46	2.82	0.39	2.98	0.55
Communication skills	**2.47**	**0.13**	**2.61**	**0.12**	**2.96**	**0.08**
• Ability to present ideas openly and objectively.	2.32	0.59	2.62	0.60	3.16	0.71
• Ability to present interesting ideas and problems.	2.36	0.53	2.54	0.54	2.98	0.71
• Often successful in communicating verbally.	2.54	0.73	2.72	0.70	2.88	0.59
• Able to efficiently express ideas through writing.	2.58	0.78	2.58	0.78	3.00	0.73
• Finds it challenging to learn from diverse individuals.	2.36	0.56	2.52	0.58	2.84	0.68
• Interacting with others fosters deep learning.	2.34	0.52	2.50	0.54	2.82	0.69
• Ability to present information and content appropriate to the audience.	2.80	0.40	2.80	0.40	3.02	0.51
Collaborative skills	**2.47**	**0.14**	**2.77**	**0.10**	**3.11**	**0.15**
• Enjoy working with people who have diverse skills.	2.40	0.49	2.40	0.49	3.14	0.40
• Prefer working in teams over working alone.	2.60	0.70	2.74	0.66	3.08	0.67
• Regularly seek advice from others.	2.34	0.48	2.54	0.54	2.90	0.36
• Listen well and collaborate effectively with others when reaching agreements.	2.58	0.84	3.00	0.70	3.42	0.61
• Adapt to various roles and responsibilities.	2.34	0.48	2.72	0.67	2.92	0.78
• Collaborate effectively with others to produce high-quality work.	2.28	0.50	2.86	0.64	3.12	0.75
• Demonstrate understanding of and respect for others' opinions.	2.98	0.51	3.08	0.60	3.10	0.58
Learn by working together and discussing with others.	2.24	0.43	2.80	0.40	3.20	0.53
Total	2.46	0.14	2.77	0.16	3.06	0.14

3.2 Unexpected Change

The findings of this investigation resulted in both anticipated and unforeseen beneficial outcomes. The study identified the following positive effects: 1) when participants recognized the advantages of the research, they became more interested and actively engaged in it. 2) following participation in brainstorming sessions, lesson analysis, and reflection on work practices, participants became more conscious of the significance of teamwork. 3) collaborative activities and the sharing of experiences on various techniques led to diversified and enhanced learning. 4) researchers gained knowledge and modified their working methods to achieve expected objectives. 5) the collaboration between teachers and administrators improved. 6) students developed self-awareness and self-worth,

gained life skills, exhibited confidence, and creativity, and learned to coexist with others joyfully.

3.3 Learning from Practice

The research team recognized the importance of developing their skills effectively and efficiently, not just at an ordinary level as previously done. These skills include communication skills, planning skills, analytical thinking skills, skills for disseminating work in electronic media formats, change management skills, team working skills, and storytelling skills, among others.

The research partcipants realized the importance of working collaboratively, coordinating with each other, engaging in cooperative work, and creating a friendly atmosphere for discussion. In addition, they also acknowledged the importance of thinking systematically, comparatively, and associatively.

The school administration of Sarakulnawitaya School understood and appreciated the importance of the vision of the school administrators that was conveyed to the teaching staff, collaborative work, fostering a strong organizational commitment, promoting personal development, and promoting real learning by engaging in actual practice.

3.4 Knowledge Gained from Practical Experience

The research has provided the Sarakulnawitaya School with knowledge gained from practical experience based on the Force-Field Analysis framework of Kurt Lewin, which illustrates a cause-and-effect model of driving forces that can be used to promote change, restraining forces that hinder change, and methods to overcome these restraining forces. The research has also provided insights into the changes that occurred as a result of the application of this framework, including the following:

Regarding the implementation of driving forces in Cycle 1, there are four components. (1) a range of 55 alternative proposals emerges from the amalgamation of academic proposals from research studies by the researchers and experience-based proposals from co-researchers. (2) working principles are set in advance of the implementation, which involves communicating clear and ambitious goals, distributing work appropriately, actively listening, resolving conflicts, and cultivating trust. (3) collaborative strategies are developed in advance of the implementation, including setting small goals, focusing on high-impact tasks, creating an action plan, accommodating different collaboration styles, promoting creativity, and sharing information and resources. (4) procedures for implementation are established in advance, which involve deepening the understanding of the development direction, leading to serious implementation, reviewing the implementation, organizing workshops, and conducting performance summaries.

Cycle 2 is characterized by various driving forces for change, namely: (1) conducting a clear review of working goals, (2) placing a greater emphasis on participatory input, (3) promoting teamwork to a higher degree, (4) encouraging serious implementation, (5) performing regular evaluations of progress, and (6) incorporating Buddhist principles such as cooperation, analysis of problem causes, and mutual assistance.

However, several significant obstacles hinder the implementation of change, including researchers' lack of understanding of good research practices, unfamiliarity with techniques for extracting lessons learned, reluctance to express dissenting opinions, inadequate comprehension of certain alternative practices, and insufficient understanding of how to effectively apply knowledge.

Nevertheless, these obstacles can be overcome through various strategies, such as creating additional documentation related to research and research techniques, breaking down lesson extraction issues into smaller topics using appropriate techniques and conjunctions, encouraging input through the creation of mind maps, deepening the mutual exchange of ideas in each alternative, and searching for effective academic proposals for applying knowledge together.

The utilization of the aforementioned driving forces and change implementation strategies resulted in changes that met expectations. Specifically, the researchers exhibited higher levels of performance compared to their previous assessments, as evidenced by mean values that increased from 2.70 to 3.00 and 3.20 before and after the first and second cycles of implementation, respectively. Similarly, the 21st-century learner skills of students also improved, with mean values that increased from 2.46 to 2.77 and 3.06 before and after the same implementation cycles, respectively. Moreover, unexpected positive changes occurred in various aspects, including learning outcomes and experiences of the researche team, research partcipants, and the school. The aforementioned details are summarized in the preceding paragraph.

In summary, the knowledge gained from the aforementioned implementation is considered a theoretical foundation rooted in collaborative action research. This knowledge is gained through practical experience in the specific context

of the Sarakulnawitaya School. The researche team and the research partcipants refer to this as the "participatory teacher model for enhancing 21st-century learner skills in Sarakulnawitaya School." This is illustrated in Figure 1.

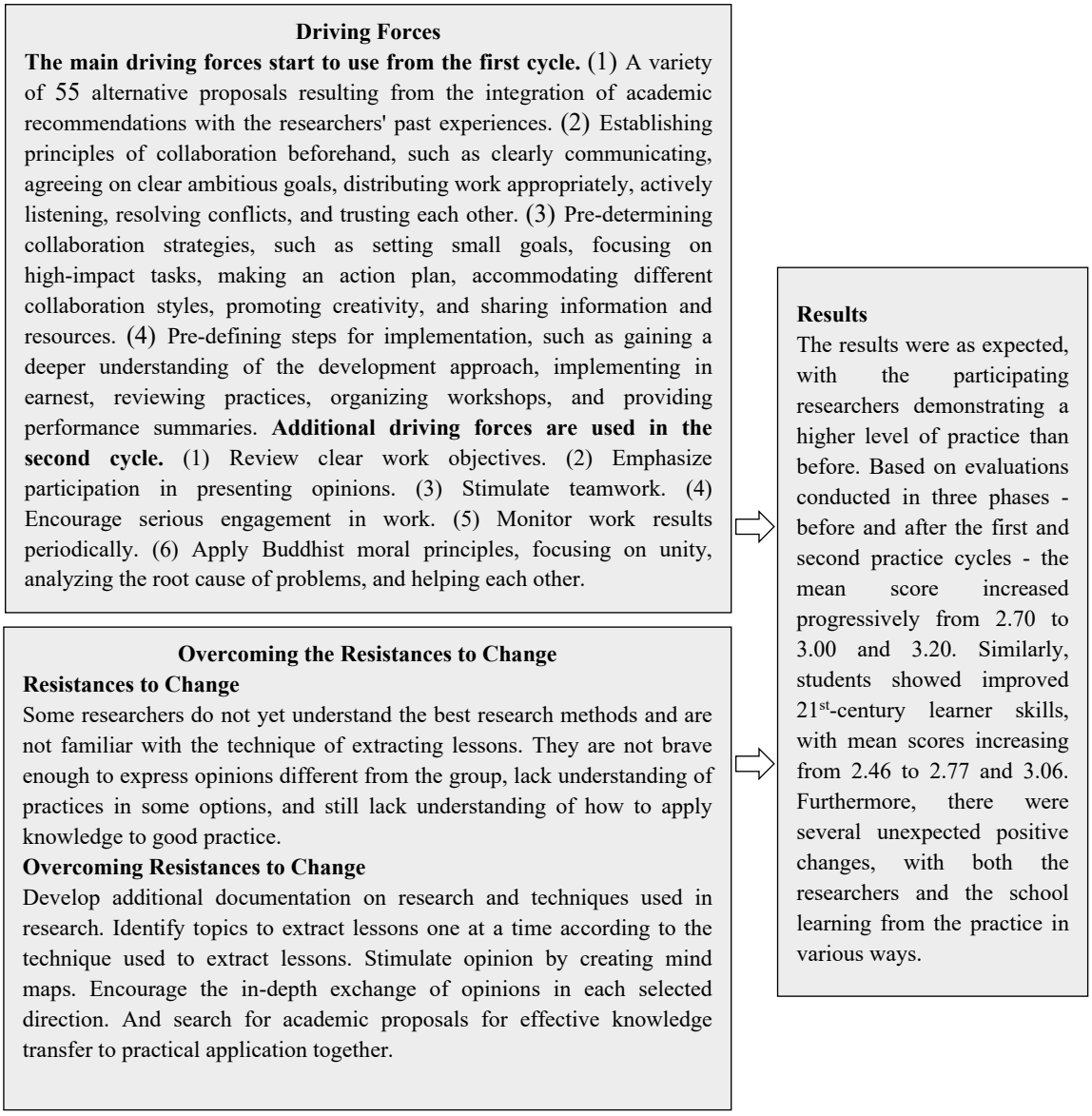

Figure 1. Prototype Model from Teacher-involved Practice to Enhance 21st-century Learner Skills in Sarakulnawitaya School

4. Discussion Conclusion, and Recommendations

As stated earlier, the objective of this research is to enhance the 21st-century skills of students at Sarakulnawitaya School, focusing on communication skills, creative thinking skills, analytical thinking skills, and teamwork skills, through a participatory action research approach that includes planning, action, observation, and reflection in two cycles, each consisting of one academic term in the 2022 academic year. The expected outcomes are 1) positive changes, 2) learning, and 3) knowledge gained from practice. The research involved 20 teacher-researchers and 50 students involved in the development. The results of the research show that the expected outcomes in all three aspects have been achieved, with the main factors being the use of driving forces for change, both the primary driving force in cycle 1 and the reinforcing driving force in cycle 2, as well as the collaboration of minds to find techniques for overcoming systemic and serious resistance to change, as described in detail above.

Among the driving forces used, the researchers emphasized the importance of *" 55 diverse alternative proposals that emerged from the integration of academic recommendations with the experience of the research participants"* as a significant driving force. This is because it is a driving force that enabled the researchers to see various options. Although some options may already be familiar, there are still many that are not. These new options stimulate out-of-the-box thinking, rather than simply repeating what has been done before. As The Indeed Editorial Team (2022) states, “to think out of the box entails taking a creative approach to problems as compared to using a more conventional style of thinking. It involves viewing a problem from a different perspective, and it can help you create effective solutions. Learning to think out of the box can be beneficial for your career by enabling you to innovate solutions for various issues in the workplace.” This leads to new and more creative actions, and in the future, there will be even more academic knowledge on the internet that will provide new ideas. Researchers will begin to have knowledge and experience from this research as a starting point for development in future cycles that are much more intensive than before. With each cycle of research and development, each one with the participation of this practical research approach, the researchers will become learning individuals, and Sarakulnawitaya, the academic institution will become a learning organization, more and more so with each subsequent cycle. Certainly, the group of people who will benefit from the results of the phenomenon that occurs is students. These are students who will cycle into the school from one academic year to another endlessly. Looking back, the successes that occur in each cycle of development will inspire school administrators and teachers to have a strong commitment to developing the learning of students, which is serious and diverse.

Another case mentioned here is the result of this research, which found that the objectives of all three aspects of the research were successfully achieved. This confirms the confidence of the research team in the operational research methodology used in this study, as it was conducted in a participatory manner where both the researchers and research participants had equal opportunities to express their opinions and engage in the process. This resulted in a high level of democracy, where both parties played active leadership roles. This can be compared to the use of management theories, such as Theory Y, Maturity Organization Theory, or System 4, or the use of leadership styles such as Practitioner Centered, Participating, Delegating, Colleague, or Employee Centered, among others (Sanrattana, 2018).

Both of the issues mentioned are in line with the research of many other researchers who have designed in their own research using such a driving force, including principles and concepts of the aforementioned PAR methodology. For example, the research on “Collaborative Practices to Empower Teachers' Capacities for the 21st Century” by Soipimai and Sanrattana (2023), “Cooperative Practices to Enhance the Quality of Work Integrated Learning. at Nong Khai Technical College” of Sarapoom and Phrakrudhammapissamai (2021), “Development of Learning by E-Learning System: A Case of Mahamakut Buddhist University, Mahavajiralongkorn Rajaviyalaya Campus” of Uttamadhammo and Phrakrusutheejariyawattana (2021), “Participatory Practice “Teach Less, Learn More”: A Case of Srikranuanwittayakom School” by Rooptam and Sanrattana (2021), “Practicing Collaborative Teachers to Strengthen Student's Visionary Leadership Skills” by Poonvichaen and Sutheejariyawat (2022), and “Teachers and Participatory Action Research for Developing Learning Environments” by Thawinwong and Sanrattana (2022).

From the foregoing point of view, it can be concluded that action-oriented research for change focuses on the driving force of various alternative recommendations arising from the integration of academic recommendations with previous experience of the research participants, and the emphasis on the principles and concepts of the PAR methodology that describes the researcher’s role changes from passive to active or cooperative, or change the method of research from on them to research by them and for them.

Therefore, it is first suggested that school administrators and teachers must be people who have a constant learning attitude, who never stop learning and developing, both in seeking new development issues that increase from the issues used in this research and each issue, emphasizing the pursuit of academic knowledge from literature related to various topics discussed in this research. At the same time, they should consider the importance of their existing knowledge and experience, to integrate them according to the principles of Knowledge Management (KM), which emphasizes "explicit knowledge + tacit knowledge ". And there is a second suggestion that in action research to develop any topic, the researcher should consider using a participatory action research approach more than choosing to use technical action research or practical action research methods, especially technical action research, which is considered a top-down research approach in which co-researchers are passive or followers, and is a commonly authoritative method. It is a research method from them with the aim of understanding or seeking knowledge of various phenomena. The researcher plays the role of an expert who conducts research with a group of co-researchers. Once the answer is obtained, the researcher leaves the problem remaining. The life and existence of the co-researchers remain unchanged and there is no benefit or change from the research, which is different from the

participatory action research approach, in which co-researchers change roles from passive to active or participants or change the research method from *them* to *by them* and *for them*. This means that the research participants are involved in every step of the process, including decision-making, implementation, and receiving the results of the research. In addition, the role of the researcher also changes from being an outside expert to a collaborative member of the research team. Furthermore, research is not only aimed at understanding or acquiring knowledge of various phenomena but also involves practical implementation to bring about desirable changes that are expected to be sustainable due to the commitment of the research participants in every step of the process.

References

Abazov, R. (2021, August 10). *5 Ways to improve your creative thinking.* Retrieved from https://rb.gy/8au5sm

Aggarwal S. (2019, February 17). *21st century learner.* Retrieved from https://rb.gy/qobxmd

Arhar, J. M., Holly, M. L., & Kasten, W. C. (2001). *Action research for teachers.* Merrill Prentice Hall.

Bachrach, A. (2019, March 11). *Effective communication skills that get results.* Retrieved from https://rb.gy/a7sdmw

Buckle, J. (n.d.). *A comprehensive guide to 21st century skills*. Retrieved from https://bit.ly/3ZPyYgF

Canvas in Structure. (n.d.). *Importance of 21st century learning and innovation skills.* Retrieved from https://rb.gy/tyfr2e

Carr, W., & Kemmis, S. (1992). *Becoming critical: Education, knowledge, and action research* (3rd ed.). Falmer Press.

Chaichanawirote, U., & Vantum, C. (2017). Evaluation of content validity for research instrument. *Journal of Nursing and Health Sciences*, *11*(2), 105-111.

Coghlan, D., & Brannick, T. (2007). *Doing action research in your own organization* (2nd ed.). Sage.

Collaborative Outcomes. (n.d.). *7 Step collaboration process.* Retrieved from https://rb.gy/4x14po

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Merrill Prentice Hall.

Dsouza, M. (n.d.). *How to improve your critical thinking skills – 7 Techniques.* Retrieved from https://rb.gy/66arpf

Eaton, S. E. (2018, January). *21 Characteristics of 21st century learners*. Retrieved from https://rb.gy/uxvq6c

Edublox Online Tutor. (2017, March 21). *8 Ways to enhance your child's critical thinking skills.* Retrieved from https://rb.gy/9s25a3

Educators Technology. (2015, January 29). *A very good checklist for assessing 21st century learning skills.* Retrieved from https://rb.gy/pcejbj

Elmansy, R. (2016, January 15). *6 Steps for effective critical thinking.* Retrieved from https://rb.gy/hlrtc5

Envision. (n.d.). *13 Essential 21st century skills for today's students*. Retrieved from https://rb.gy/nuue0p

Fisher, M. (n.d.). *How to design a 21st century assessment*. Retrieved from https://bit.ly/2q5V9kk

Flinders University. 2022). *Linking theory and practice*. Retrieved from https://bit.ly/43hyIdi

Garfinkle J. (n.d.). *9 Tips for improving your communications skills.* Retrieved from https://rb.gy/74doll

Gill J. (2020, September 2). *21st century competencies in students: What are they and why are they important?* Retrieved from https://rb.gy/m4hlj2

Glen Ellyn School District. (n.d.). *Our learner characteristics.* Retrieved from https://rb.gy/gvrpow

Haroon, S. (2017, October 19). *6 Major characteristics of 21st century learners*. Retrieved from https://rb.gy/0dmfql

Hogue, R. J (2011, September 21). *Who is the 21st century learner?* Retrieved from https://rb.gy/kjgte9

Holland, B. (2015, October 15). *Operationalizing the information age, knowledge economy, 21st century*. Retrieved from https://bit.ly/40W20ga

IGI Global. (n.d.). *What is 21st century learner*. Retrieved from https://rb.gy/1yih99

Indeed. (2019, December 12). *6 Ways to improve critical thinking at work.* Retrieved from https://rb.gy/0bis9v

Indeed. (2019, May 9). *Collaboration skills: Definition and examples.* Retrieved from https://rb.gy/rghalo

Indeed. (2019, October 7). *How to develop creative-thinking skills in 5 steps.* Retrieved from https://rb.gy/pb02fu

James, E. A., Milenkiewicz, M. T., & Bucknam, A. (2008). *Participatory action research for educational leadership: Using data-driven decision making to improve schools.* Sage.

Jones, G. (n.d.). *Characteristics of a 21st century learner*. Retrieved from https://rb.gy/fdq4wg

Jones, P. (n.d.). *10 Steps to improve your workplace communication skills.* Retrieved from https://rb.gy/bwduhk

Kavanaugh, J. (2018, May 3). *Four steps to improve critical thinking.* Retrieved from https://rb.gy/la79oy

Kemmis, S., & McTaggart, R. (1992). *The action research planner* (3rd ed.). Deakin University.

Kim, L. (2015, November 4). *9 Ways to dramatically improve your creativity*. Retrieved from https://rb.gy/qlmtzf

Leedy, P. D., & Ormrod, J. E. (2001). *Practical research: Planning and design.* (7th ed.). Merrill Prentice Hall.

Life Skills Group. (2019, June 5). *Skills for 21st century learners & why they're important*. Retrieved from https://rb.gy/6oe9ty

Locke, K. (2001). *Grounded theory in management research.* Sage.

Lunenburg, F. C., & Ornstein, A. C. (2000). *Educational administration: Concepts and practices* (3rd ed.). Wadsworth Thomson Learning.

Master Class. (2021a, June 8). *Effective communication: 6 Ways to improve communication skills.* Retrieved from https://rb.gy/jn8aoo

Master Class. (2021b, August 31). *How to improve creativity: The 5 stages of the creative process.* Retrieved from https://rb.gy/z8valv

McTaggart, R. (1991). Principles for participatory action research. *Adult Education Quarterly, 41*(3), 168-187.

McTaggart, R. (2010). *Participatory action research or change and development.* James Cook University.

Mills, G. E. (2007). *Action research: A guide for the teacher researcher* (3rd ed.). Merrill Prentice Hall.

Mistry, B. (2020, October 1). *8 Steps to boost your creativity*. Retrieved from https://rb.gy/5usojw

Mojecosie. (2014, July 16). *A comprehensive checklist of the 21st century learning and work skills.* Retrieved from https://rb.gy/7q9hmu

Moreo, J. (n.d.). *4 Steps to perfecting your communication skills.* Retrieved from https://rb.gy/ppq0ot

Nichols, J. R. (n.d.). *7 Skills students will always need*. Retrieved from https://rb.gy/wsjflp

Oxford University Press. (2013, October 9). *5 Ways to prepare your students for the 21st century*. Retrieved from https://bit.ly/3ZOfCIJ

Patel, D. (2019, May 15). *14 Proven ways to improve your communication skills.* Retrieved from https://rb.gy/o9gnfo

Patterson, R. (2020, June 26). *7 Ways to improve your critical thinking skills.* Retrieved from https://rb.gy/riq5a3

Payne, K. (n.d.). *13 Simple ways to build collaboration skills in the workplace.* Retrieved from https://rb.gy/zk1gi0

Peshev, M. (2020, August 12). *11 Strategies to improve your creative thinking skills.* Retrieved from https://rb.gy/rrvo7i

Pinterest.fr. (n.d.). *Twenty-first century skills checklist for students.* Retrieved from https://rb.gy/xufk4u

Poonvichaen, J., & Sutheejariyawat, P. (2022). Practicing Collaborative Teachers to Strengthen Student's Visionary Leadership Skills. *Education Quarterly Reviews, 5*(3), 231-245. https://doi.org/10.31014/aior.1993.05.03.541

Rasmussen University. (2014, January 29). *Critical thinking: Steps to critical thinking.* Retrieved from https://rb.gy/cj5t1h

Ravitz, J. (2014, January). *A survey for measuring 21st century teaching and learning: West Virginia 21st century teaching and learning survey*. Retrieved from https://rb.gy/1i7kwx

Half, R. (2018, 2022 October 7). *5 Ways to develop your workplace collaboration skills.* Retrieved from# https://rb.gy/j5lcgw

Rooptam, S., & Sanrattana, W. (2021). Participatory practice "Teach Less, Learn More": A case of Srikranuanwittayakom school. *Education Quarterly Reviews, 4*(2), 578-592.# https://doi.org/10.31014/aior.1993.04.02.302

Ross, D. (2017, April 24). *Empowering our students with 21st-century skills for today.* Retrieved from https://bit.ly/3ZTKqb5

Rovinelli, R. J., & Hambleton, R. K. (1977). On the use of content specialists in the assessment of criterion-referenced test item validity. *Dutch Journal of Educational Research, 2*, 49-60.

Sanrattana, W. (2018). *Research in educational administration: Concepts, practices and case studies* (4th ed.). Thiphawisut.

Sarapoom, C., & Phrakrudhammapissamai. (2021). Cooperative practices to enhance the quality of work integrated learning at Nong Khai Technical College. *International Journal of Educational Methodology, 7*(3), 387-400. https://doi.org/10.12973/ijem.7.3.387

Sean, H. (n.d.). *Twenty-first century skills checklist for students*. Retrieved from https://rb.gy/9q6boi

Sindell, T., & Sindell, M. (2014, June 10). *The three steps maximizing your collaboration skills.* Retrieved from https://rb.gy/r4c5ja

Soipimai, W., & Sanrattana, W. (2023). Collaborative practices to empower teachers' capacities for the 21st Century. *World Journal of Education*, *13*(1), 30-44. https://doi.org/10.5430/wje.v13n1p30

South Africa Today. (2017, March 8). *What does it mean to be a 21st-century learner?* Retrieved from https://rb.gy/lnekfi

Sriraman, P. (n.d.). *21st Century skills*. Retrieved from https://rb.gy/zebwvb

Stauffer, B. (2022, January 10). *What are 21st century skills*? Retrieved from https://bit.ly/3UlRz2Q

Summer, J. (n.d.). *5 Steps to effective communication skills: How to keep it real in business and in life.* Retrieved from https://rb.gy/5zh845

Taylor, J. (n.d.). *The five stages of the creative process.* Retrieved from https://rb.gy/hafpkd

Teach Thought Staff. (n.d.). *4 Essential rules of 21st-century learning.* Retrieved from https://rb.gy/p7f8bw

Thawinwong, C., & Sanrattana, W. (2022). Teachers and participatory action research for developing learning environments. *World Journal of Education, 12*(3), 17-28. https://doi.org/10.5430/wje.v12n3p17

The Indeed Editorial team. (2022, December 2). *Thinking out of the box (definition, benefits and tips)*. Retrieved from https://sg.indeed.com/career-advice/career-development/thinking-out-of-the-box

UCLA: Statistical Consulting Group. (2016, August 22). *What does Cronbach's alpha mean?* Retrieved from https://bit.ly/3Kn15hJ

Uttamadhammo, P. P., & Phrakrusutheejariyawattana. (2021). Development of Learning by E-Learning System: A Case of Mahamakut Buddhist University, Mahavajiralongkorn Rajaviyalaya Campus. *World Journal of Education, 11*(3), 47-59. https://doi.org/10.5430/wje.v11n3p47

Vaden, A. (2020, April 17). *What are 21st century skills?* Retrieved from https://bit.ly/3KnMfHD

Wabisabi Learning. (n.d.). *The critical 21st century skills every student need's and why*. Retrieved from https://rb.gy/krzemw

Wagner, K. (2019, March 16). *Four- step process to develop 21st century skills in your students.* Retrieved from https://bit.ly/3Ujh2Kh

Wells, K. (2018, February 14). *4 Expert tips for improving your team collaboration skills.* Retrieved from https://rb.gy/ej97cm

Willis, J. W. (2007). *Foundations of qualitative research: Interpretive and critical approaches.* Thousand Oaks.

Zwilling, M. (2012, September 17). *10 Ways to enhance your team collaboration skills.* Retrieved from https://rb.gy/11twuz