

Northwestern College, Iowa

**NWCommons**

---

Master's Theses & Capstone Projects

Education

---

Fall 2020

## Implementing 21st Century Learning and Innovation Skills in Classrooms

Amber Soderlund

Follow this and additional works at: [https://nwcommons.nwciowa.edu/education\\_masters](https://nwcommons.nwciowa.edu/education_masters)



Part of the [Educational Methods Commons](#), and the [Online and Distance Education Commons](#)

---

Implementing 21<sup>st</sup> Century Learning and Innovation Skills in Classrooms

Amber Soderlund

Northwestern College

A Literature Review Presented in Partial

Fulfillment of the Requirements

For the Degree of Master of Education

## Table of Contents

Abstract.....	3
Introduction.....	4
Review of the Literature .....	7
Collaboration.....	9
Elementary Education.....	10
Secondary Education.....	12
Communication.....	13
Elementary Education.....	14
Secondary Education.....	14
Creativity.....	15
Elementary Education.....	16
Secondary Education.....	17
Critical Thinking.....	17
Elementary Education.....	17
Secondary Education.....	18
Gaps in Literature.....	19
Areas for Future Research.....	20
Conclusion.....	21
References.....	22

### Abstract

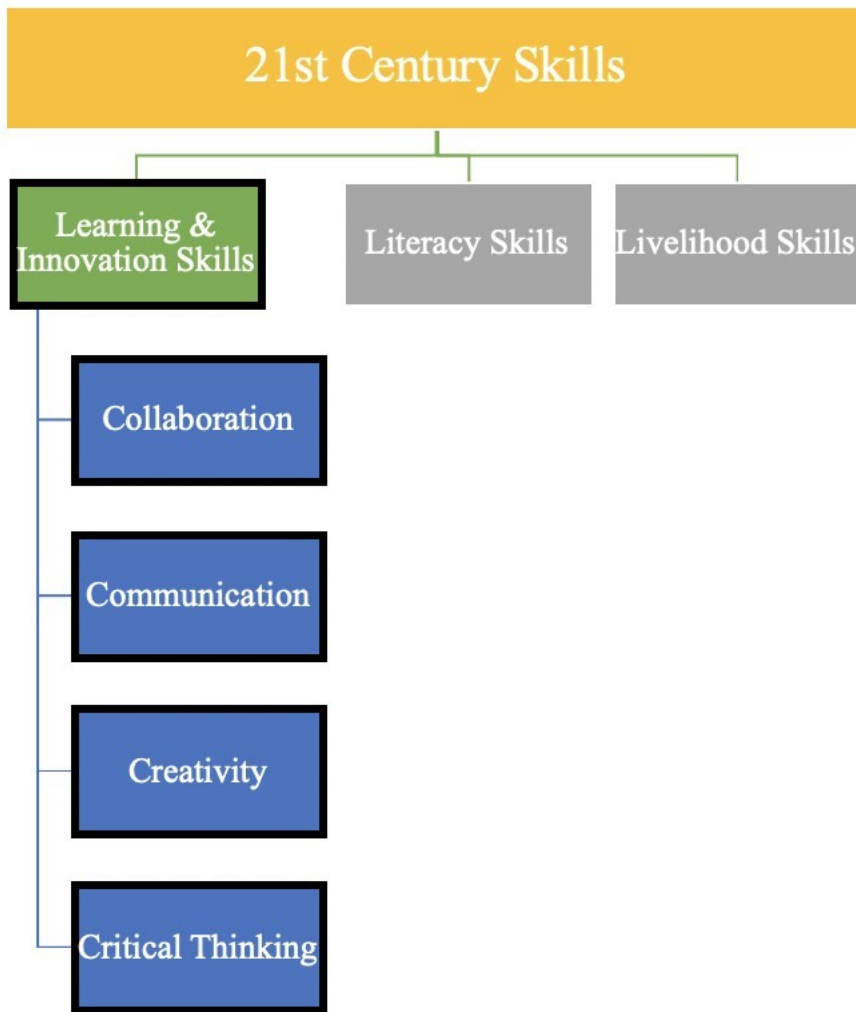
This literature review depicts strategies educators can implement to facilitate 21<sup>st</sup> century learning and innovation skills in classrooms: collaboration, communication, creativity, and critical thinking. One challenge educators currently face with implementing these skills in the classroom is being required to move to online learning or other learning formats as safety and health remain a top priority during the pandemic. This has caused teachers to reinvent the way they teach their students to communicate, work with one another, and display critical thinking and creativity skills. Many educators are reinventing teaching in schools without an increase in resources and guidance from the state or federal levels. This literature review analyzes research-based strategies in successfully implementing the four learning and innovation skills: collaboration, communication, creativity, and critical thinking. The presented information and strategies can be used during and beyond the pandemic for families, educators, and schools to reach this ultimate goal of preparing lifelong learners for success.

*Keywords:* collaboration, communication, creativity, critical thinking, 21<sup>st</sup> century skills, learning, innovation

### **Implementing 21<sup>st</sup> Century Learning and Innovation Skills in Classrooms**

Schools across the US continuously improve the effectiveness in teaching and measuring 21<sup>st</sup> century skills. The demand for implementing learning and innovation skills exists for teachers across the country, but there is a lack of understanding on how to effectively implement such skills (Kim, H. J., Park, J. H., Yoo, S., & Kim, H., 2016). Effective implementation of these skills in schools help individuals, communities, and the country as a whole succeed in creating an altruistic society.

The framework for 21<sup>st</sup> century skills was “developed with input from educators, education experts, and business leaders to define and illustrate the skills, knowledge, expertise, and support systems that students need to succeed in work, life, and citizenship” (Battelle for Kids, 2019, p. 1). The 21<sup>st</sup> century skills are divided into three categories; learning and innovation, literacy, and livelihood skills (Figure 1). This literature review focuses on the implementation of the “learning and innovation” portion of 21<sup>st</sup> century skills. The learning and innovation sector can be broken down into four categories, referred to by educators as the “Four C’s.” The Four C’s are collaboration, communication, creativity, and critical thinking (Figure 1). Collaboration is defined as students working with one another towards a common goal. Communication is defined as exchanging explicit and implicit messages. Creativity involves discovering a range of strategies to contemplate the same problem. Critical thinking is “a way of approaching and solving problems based on arguments that are persuasive, logical, and rational” (Florea, N.M. & Hurjuri, E., 2015, p. 566). These skills are especially necessary to implement in schools because they are critical for all career paths and finding successful livelihood.



**Figure 1.** Conceptual model for the Learning & Innovation Skills portion of 21<sup>st</sup> Century Skills (based on Battelle for Kids, 2019).

Due to necessary distancing and safety protocols amidst a global pandemic, collaboration, communication, creativity, and critical thinking becomes much more challenging to implement in the classroom. The problem with online schooling and social distancing protocols in place is that students are not able to effectively practice listening or speaking skills, work in groups, or apply deeper level thinking like they would in a traditional classroom model. Prior to the pandemic, schools and classrooms utilized small groups and partnerships to exercise

strategies to implement collaboration, communication, creativity, and critical thinking. For students to find success in practicing 21<sup>st</sup> century skills, schools need to provide training for educators to implement differing strategies for both in-person learning as well as online settings. The Four C's can be used as a universal framework in education to ensure all students receive instruction and participate in activities that increase their skill levels. This sets all learners up for success in school and life beyond.

The purpose of this literature review is to identify and compare research-based strategies for implementing 21<sup>st</sup> century learning and innovation skills in classrooms; these skills include students' ability to collaborate, communicate, think critically and be creative. Scholarly journals were located based on the topic of "teaching and learning 21<sup>st</sup> century skills." The sources utilized throughout this literature review have been written in the last ten years. Some publications were excluded due to solely addressing literacy and life 21<sup>st</sup> century skills, rather than focusing on the 4 C's of learning skills. The scope of the research includes strategies for working with pre-kindergarten to 12th-grade students, which excludes implementing the skills with college students and adults.

Educators implement strategies to increase student success surrounding collaboration, communication, creativity, and critical thinking through added supports. One example of added support is professional development opportunities surrounding specific strategies for educators to apply in the classroom. Teachers are able to find more success with implementation when research-based strategies are introduced in professional growth settings. Another added support is administrators sanctioning time to plan for implementing the Four C's within instruction; this is especially necessary with the everchanging learning formats due to the current pandemic. Instruction, including implementing the Four C's, looks very different within in-person, hybrid,

and distance learning settings. In-person settings allow students to work together, as long as they are with in a safe distance. Hybrid learning settings change the group and partnership make-ups, heavily impacting the students' ability to practice collaboration, communication, critical thinking, and creativity. In distance learning settings, students are only able to practice the Four C's in a digital setting. Therefore, time and strategies specific to every learning format is necessary in setting all learners up for success.

The Four C's examined throughout the literature review is perceived through two lenses: elementary classrooms and middle/high school classrooms. The elementary lens includes information for educators of pre-kindergarten through 5<sup>th</sup>-grade students. The secondary lens for each skill includes information for individuals who work with students 6<sup>th</sup> through 12<sup>th</sup>-grade. Increasing effective implementation of collaboration, communication, critical thinking, and creativity across grade levels in schools help prepare lifelong learners throughout the country.

### **Review of the Literature**

Every Student Succeeds Act (ESSA) was enacted by President Barack Obama in 2015. The passing of this act allowed funding for 21<sup>st</sup> century learning centers. These learning centers were implemented as decided by State Educational Agencies. The agencies have various tactics for encouraging 21<sup>st</sup> century skills within schools. For example, the Minnesota Department of Education utilizes funds from the Title IV, Part B: 21<sup>st</sup> Century Community Centers to “extend the school day” and by “offering out-of-school time programs” (Minnesota Department of Education, 2018, p. 1). When implemented with fidelity, these programs support student learning outside of the classroom and invite families to be a part of the learning experiences. However, funds and learning frameworks need to be established for the primary school day in addition to out of school programs in order to reach all students.



One framework used to facilitate 21<sup>st</sup> century learning and innovation skills throughout the school day is to teach the Four C's is through a flipped teaching model. Graziano's research (2016) indicates flipped lessons are "interactive and fun, and students reported being more productive and enthusiastic about class" (p. 121). The flipped teaching model involves brief teacher instructional time and lengthier student work and collaboration time. Onyema and Daniil (2017) state students increase knowledge, understanding, and use of online resources as learning preferences shift away from lecture-style teaching (Onyema, O. G. & Daniil, P., 2017). The flipped classroom strategy emerged in order to meet the differing needs and learning styles of 21<sup>st</sup> century learners.

While the flipped teaching model is effective due to students' changing learning styles, other frameworks provide more specific guidelines for effective implementation. The research from Saaverdra and Opfer (2012) describes a framework that provides further guidance. The Assessment and Teaching of 21<sup>st</sup> Century Skills Consortium (AT21CS) is a framework incorporating nine lessons to improve implementation of 21<sup>st</sup> century skills in classrooms: "make it relevant, teach through the disciplines, develop thinking skills, encourage learning transfer, teach students how to learn, address misunderstandings directly, treat teamwork like an outcome, exploit technology to support learning, and foster creativity" (Saaverdra, A. R. & Opfer, V. D., 2012, p. 11). The presented strategies from AT21CS are used as a guide for educators to find purpose in implementing the learning and innovation skills in their own classroom settings.

Using the learning and innovation skills within the 21<sup>st</sup> century skills framework benefits students by preparing them to meet future career requirements. The Institute for the Future (2019) proclaims that our society is in the fourth Industrial Revolution because of the rapidly increases of technology, which is promoting "new industries, jobs, places of work and working

patterns” (p. 1). With this being the case, students are expected to be acquiring innovative skills to become flexible learners to meet the demands of the working industries. The following strategies were compiled to help educators effectively implement 21<sup>st</sup> century learning and innovation skills within the classroom. These skills should be embedded across all content areas including, but not limited to, mathematics, literacy, science, and social studies.

### **Collaboration**

Collaboration is defined as individuals working with one another towards a common goal. Research from Prenger, et al. (2019) outlines collaboration at the teacher-level before facilitating collaboration between students. The collaboration through Professional Learning Communities (PLCs) directly impacts student learning (Prenger, R., Poortman, C., & Handelzalts, A., 2019, p. 441). Whether students are witnessing the collaboration firsthand or it is happening behind the scenes, students benefit from strong collaborative efforts by teachers. The witnessed collaboration serves as the benchmark reference for students, especially for students at the elementary level.

Increased levels of student achievement have also been observed when collective cooperation is present with teachers at a school. Becker’s research (2017) analyzes a team of fourth grade teachers from Iowa. The team became more intentional with how often they met for Professional Learning Community (PLC) and what they focused on during the PLC meeting times. Becker reports the team put structures in place, such as establishing team norms and increasing exposure to effective teaching strategies, which led to stronger collective efficacy (Becker, E., 2017). A positive work ethic is instilled in students with this type of collaboration at the teacher level.

### Elementary Education

Student growth in collaboration skills has been identified when students are witnessing the desired collaborative skills firsthand. Margaret Wilson’s research (2012) focuses on extensive interactive modeling at the elementary level beginning with teacher modeling, followed by practicing speaking and listening skills with a partner, then moving into collaborative groups. According to Wilson, the “interactive” part of modeling the skill gives younger students an active role in the experience, leading to stronger engagement. Interactive modeling is a seven-step process in which students are a part of the process of demonstrating skills. This approach is outlined in Wilson’s book *Interactive Modeling: A Powerful Tool for Teaching Children* and is used to “show students exactly how to do what we expect” (Wilson, M. B., 2012, p. 2). At the early elementary age, most students have had very few opportunities to collaborate with peers. Utilizing interactive modeling steps for speaking and listening skills benefit students’ level of collaborative skills. Teachers can model collaboration for students to strengthen their own skills (Table 1). Wilson’s interactive modeling steps can be used for an educator to demonstrate collaborating with a partner.

**Table 1.** Interactive Modeling steps for collaborating with a partner (based on Wilson, 2012).

<b>Interactive Modeling Steps</b>	<b>Teacher Steps for Modeling Collaboration</b>
1. Say what you will model and why.	“It’s respectful to listen to your partner when he or she is talking. I’m going to turn and share with Ms. K. Be ready to share what you notice.”
2. Model the behavior.	The teacher walks to meet with a partner and turn to face with whole body listening. Take

	turns sharing ideas. Turn back to join the class.
3. Ask the students what they noticed.	“What did you notice us doing?” <i>You were calm. You looked at your partner when she was speaking. You waited your turn to speak.</i>
4. Invite one or more students to model.	“Who can show us how to turn and share with a partner in a respectful way?”
5. Again, ask students what they noticed.	“How did Peter sit and listen? How did Ann expectedly share her ideas?” <i>He had a calm body and looked at his partner. She used a calm voice and shared only about what was expected.</i>
6. Have all students practice.	“Think about your answer to the question: How can you and your help make our classroom even cleaner? Turn to your partner.” <i>We could take turns with different cleaning jobs in the classroom.</i>
7. Provide feedback.	Have students turn back to class discussion. Share what you noticed.

Collaboration can be challenging, especially for younger students with minimal exposure in schooling. One variable to be considered is how the partnerships are created in the classroom. Some students may refuse to work with their assigned partners. This has been labeled as

“grouping resistance” (Foutch, R. L., 2017, p. 4). Some students need assistance from the teacher in finding a partner. When the social skill of selecting a partner is eliminated, the student can instead focus energy on the topic at hand. In other words, spend more time collaborating and less time being preoccupied with whom their partner will be. The classroom teacher needs to separate the skills and decide what the focus is: practicing how to select a partner or how to work with a partner.

### **Secondary Education**

Several studies address increasing effectiveness of implementing collaboration skills with secondary students. Collaboration is an important foundation for other learning and innovation skills. Researchers understand the importance of focusing on collaboration at the beginning of the year to build this base.

Collaboration is a “gateway skill because producing work with others is a highly challenging skill to acquire” (Jacobson, V. L., 2016, p. 87). In addition to collaboration empowering students’ potential in future career endeavors, research also shows students’ confidence, self-efficacy, and credibility increase. Jacobson (2016) collected data on sophomores, juniors, and seniors in high school using interviews, demographics, observations, and written response journals. Through these data collection tools, Jacobson (2016) found the participants “appreciate[d] the art of collaboration, recognizing the challenges and successes inherent in people management and interpersonal relationships” (p. 87). Jacobson (2016) created a professional development workshop titled “Teaching Students the Communication and Collaboration Skills That Make Them Successful in the Classroom and Beyond” to share his results and encourage educators to hold collaboration skills to a high standard in the classroom.

A common theme for facilitating collaboration at both the elementary and secondary levels include intentional grouping. Assembling students in planful groups or partnerships is important for students to find success in groupwork. Diverse strategies can be implemented with the purpose of groups in mind. Teacher researchers like Kaitlyn McGlynn and Janey Kozlowski (2016) examined homogeneous versus heterogeneous ability grouping. When the educator's goal is to help learners who are struggling, heterogeneous ability grouping would be most effective (McGlynn, K. & Kozlowski, J., 2016). Homogeneous groups are most appropriate when the goal is to challenge high-ability students.

### **Communication**

Communication is defined as exchanging messages through a variety of media. Teaching communication skills is necessary for student growth. According to Ferres (2017), the human mind can be referred to as a network of ideas. The efficacy of communication taught in schools can be increased if it “adapts to the interactive demands of the network metaphor” (Ferres, 2017, p. 59). When adapting to the idea that the mind is like a network, increasing focus on emotions, interaction, and storytelling aids in effective communication. Ferres (2017) believes this adaptation is effective for teaching communication in schools because “to influence others, it's more important to know about the minds of the people you want to influence than the contents through which you aim to influence them” (p. 59). When you recognize the present emotions of the individuals you are communicating with, you can match the tone of the conversation and communicate effectively. Ferres (2017) also believes the communicator must connect the content to the listener's own life, or explain how it affects them, in order to be considered an effective communicator. Adapting to the communication practice of focusing on emotional interactions needs to happen for schools to facilitate effective communication skills.

### **Elementary Education**

Rather than adjusting the contents and methods of teaching communication, other researchers have found students effectively build on their communication skills when they are simply presented with opportunities to practice. Research by Andzik, Chung, and Kranak (2016) is based on the idea that all learners must be presented with opportunities to practice communication, including students who have complex communication needs. Opportunities are presented to this population of students by providing augmentative and alternative communication (AAC) systems. The study by Andzik, Chung, and Kranak (2016) found that students using AAC systems were presented an average of 17 opportunities to respond per hour. The observed communication events included peers, general education setting, special education classroom, and a non-academic setting. The opportunities to communicate were most often present in a special education classroom. There is a need to increase opportunities with peer and in a general education setting. Andzik et al. (2016) state, “for many students with complex communication needs, developing effective communication skills is a key outcome that leads to enhanced quality of life during and beyond the school years” (p. 278).

Ferres (2017) believes teachers should teach communication skills through emotion and storytelling. Andzik (2016) believes it is vital to shift attention to increasing the number of opportunities for communicating and providing AAC for students with low communicative skills are the most effective strategies. A combination of these strategies can be used at the elementary level.

### **Secondary Education**

When it comes to teaching communication to students at the secondary level, researchers like Sugito (2017) have tested strategies such as problem posing and presentation. Sugito (2017)

defines problem posing as “experience the mathematical process, ask questions, formulate and test the conjecture, and prove the result” (p. 18). Problem posing is commonly found in mathematics classroom, but the research shows extending this technique into other areas of coursework is beneficial.

Strengthening communication through presentation skills includes stating, explaining, supporting, and restating ideas (Sugito, S. M., 2017). Sugito (2017) collected an initial score and post-score of communication skills for 34 seventh-grade students. All 34 students increased in communication skills by an average of 10% according to the questionnaire results. The questionnaire included items such as “I discuss materials with my friends,” “I discuss to find out the correct answer,” “I give opportunities to my friends to ask questions,” etc. The results proved using problem posing, presentation, and providing feedback enhanced communication skills of the students.

Facilitating student reflection surrounding the development of 21<sup>st</sup> century skills helps students think about how the personal development of their education affects them as individuals (Jacobson, V. L., 2016). Reflection of communication skills can be done by implementing routine surveys for students to contemplate effectiveness and implications of communication skills. Educators can then use the reflective writing as a guide to build and design curriculum based on concrete evidence collected by students.

### **Creativity**

Creativity is purposely reviewed following collaboration and communication skills. Research shows collaboration and communication are the “gateway skills to the rest of the 21<sup>st</sup> century skills development” (Jacobson, 2016, p. 87). When students have a strong base of



collaborative and communicative skills, they are able to further build with 21<sup>st</sup> century learning skills. Creativity is developed by students applying a variety of strategies for the same problem.

Creativity in art education has evolved to focus around the process rather than the product. This art education approach is known as Teaching for Artistic Behavior (TAB). TAB has become a nationally recognized strategy for implementing creativity in the art classroom (Mathison, C. J., 2019, p. 4). Art educators using TAB generally set up the classroom with open art studios to allow for free-choice of materials and methods. The studio set up promotes more creativity than whole-class projects. According to a survey of 319 K-12 teachers, most teachers shared the belief that creativity is in the process (Stone, D. L., 2015). The strategy of focusing on the process of a project can be applied to the general education classroom in areas other than just in art, such as writing. Focusing on the process of writing assignments, rather than the product to have something ‘nice’ to have on display in the hallway is important to the creative process.

### **Elementary Education**

Creative play and exploration are both necessary for child development. Children learn and develop cognitive skills, physical abilities, new vocabulary, social skills, and literacy skills through play (Bongiorno, n. d.). While educational professionals are familiar with the research on play, creativity can be pushed to the side due to increase in academic demands, even at the elementary level. Canadian researchers from the University of British Columbia conducted a three year-long study with K-6 students focusing on creative thinking and inquiry. Latta et al. (2017) stressed the importance of curricular change to meet the goal of incorporating creative thinking into everyday learning by stating “teacher education programs purposefully partner with schools and community settings – to grow professional knowledge and create programs of study that assume inquiry as stance—need to be thoughtfully planned and implemented over multiple

years” (p. 213). Creativity needs to be mindfully planned for and implemented in classrooms, rather than simply occurring by chance.

### **Secondary Education**

The research by Latta et al. (2017) pointed to a need to increase focus on implementing creativity at the elementary level, but the researchers noted there was pushback at the school in study due to academic pressures. This is increasingly true as students get older and expectations continue to grow. However, creativity is still important at the secondary level.

Researchers offer concrete principles to implement at the secondary level. One study by Batchelor and Bintz (2013) identified four principles in promoting creativity in students: “create a climate that values differences, values creativity, active, purposeful, and collaborative learning, and uses multiple ways of knowing” (p. 5). Overall, school leadership teams need to outline the importance of creativity and play at all grade levels.

### **Critical Thinking**

The numerous definitions surrounding critical thinking can be encapsulated to “careful thinking directed to a goal” (Hitchcock, D., 2018, p. 1). When students have built strong foundations of skills for learning, specifically collaboration and communication, they will be able to instill learning through critical thinking. They will be able to apply skills towards reaching a goal and ask questions to get there.

### **Elementary Education**

Several studies address the strategies implemented by schools to increase critical thinking skills with students. One study by Florea et al. (2015) explains teaching critical thinking skills is effective when the teacher “encourages children to think independently, to speculate, to ponder, accept different opinions and ideas, actively confronts ideas, and believe they will not be

ridiculed for opinion” (p. 571). Florea et al. (2015) conducted her research with students using the Reading and Writing for Critical Thinking (RWCT) program. The mission of the program is to “promote and implement critical thinking across the educational spectrum around the world” (Reading and Writing for Critical Thinking International Consortium, 2011, p. 3).

All students can apply critical thinking skills at some degree, but gifted and talented students have been specifically studied. Kettler (2014) studied critical thinking among elementary students including 208 fourth grade students. Of the students, 45 were gifted students and 163 were general education students. The gifted students did display “advanced critical thinking skills” compared to general education students (Kettler, 2014). This implies educators can challenge students with critical thinking activities based on skill level. The findings may affect how teachers group students and assign content in critical thinking learning activities.

### **Secondary Education**

Service-learning is a way to immerse students in situations to apply critical thinking skills outside the four walls of a classroom. Researchers have found positive benefits for implanting civics in their curriculum while still meeting content standards. Service-learning immersions benefit students in middle- and high-school grades as well as elementary students. Having secondary students teach younger students as a service-learning opportunity develops critical thinking skills (Nunn, J. A. & Braud, J., 2013).

A welcoming classroom environment is important to maintain so that students are encouraged to display critical thinking skills. Researchers like Gaby McDonald (2012) have found that “trust your results and defend them” was not a helpful strategy for schools with goals to promote critical thinking. McDonald’s study (2012), completed with AP Biology students, found this to be an unsuccessful strategy because it does not promote making mistakes, which is

important for student scientists to feel comfortable. Focusing on the importance of mistakes helps create a comfortable environment for learners to struggle and succeed.

### **Gaps in Literature**

The website for the Partnership for 21<sup>st</sup> Century (P21) organization was outdated with a 2008 resource on the 21<sup>st</sup> Century learning framework. A nonprofit organization out of Ohio, Battelle for Kids, created a network to oversee the P21 initiative; the framework was updated by Battelle in 2019. The partnership consists of businesses, organizations, and associations working towards implementing 21<sup>st</sup> century learning in schools across the country. There is a gap in information due to the transitioning of leadership.

Researchers of the reviewed literature addressed the need to provide training for teachers for implementing the learning and innovation skills. There is limited information on how schools effectively implement training on the 4 C's. The author reached out to Battelle for Kids to gather more information for their own school to implement training on 21<sup>st</sup> century skills, but did not receive a response back.

While research showed benefits of implementing service learning in classrooms, there is a lack of information on educators moderating the debates and discussion in classes. The ethics and decision making behind teachers allowing or supporting students who choose to explore political, religious, or divisive topics was not found in the scope of research. A group of assistant professors from California and Alabama describes this gap well when summarizing their research on citizenship in the classroom: “ultimately, working to close the loop between theory and practice, as well as the process for defining and understanding citizenship is messy and complex, however, we wholeheartedly believe that the journey is the reward” (Ponder, J., Veldt, M. V., & Lewis-Ferrell, G., 2011, p. 64). Former U.S. Secretary of Education, Arne Duncan

(2012) has expressed the connection of debate with the learning and innovation skills, specifically with secondary students. The power of debate should be present in classrooms of all ages to form skills.

### **Areas for Future Research**

This literature review was conducted amidst a global pandemic. Teaching strategies are changing at a rapid rate to meet the needs of learners in a variety of learning settings. All of the literature reviewed was written pre-pandemic. It is vital that educators collect data during this pandemic because implemented educational strategies before the pandemic will ultimately differ compared to post-pandemic. Students are practicing collaboration, communication, critical thinking, and creativity in innovative ways as they learn in distance or hybrid models. Focusing on the four C's can help aid student learning through the unprecedented time.

Most researchers of the reviewed literature suggest implementing strategies to improve the learning of collaboration, communication, creativity, and critical thinking. Professional development needs to be provided in order to make the positive shifts. Future research should include the effects of implementing professional development for educators and establishing a 21<sup>st</sup> century learning skills framework. Additionally, the effectiveness of Professional Learning Communities (PLCs) in implementing the learning and innovation skills would be studied.

The correlation of students' mindsets and their success in the learning and innovation skills is an area for future research. It would be expected that students with a growth mindset would be higher achievers in collaborating, communication, creativity, and critical thinking. Growth mindset implementation would benefit all students (Mueller, 2019).

### **Conclusion**

The learning and innovation skills of the 21<sup>st</sup> century learning framework have the potential to be a universal structure for educators to use as a guide for setting all students up for success. The growing body of literature has shown educators and school systems continue to implement successful strategies to implement the four C's of 21<sup>st</sup> century learning. Collaboration, communication, creativity, and critical thinking all contribute to a learner's experience and future career endeavors.

It is necessary to actively implement the learning and innovation skills. Collaborating with others does not come naturally to most students (Kuhn, 2015). Collaboration is successfully incorporated in learning experiences through teacher collaboration, interactive modeling and specific grouping. It also helps increase confidence in learners. Communication can be taught through storytelling and emotion and ensuring there is a plethora of opportunities available for students to communicate with one another. Having students reflect on their communication opportunities and skills is also beneficial to increasing the effectiveness of this learning skill. Creativity is effectively immersed in classrooms when curriculum such as TAB is implemented, play is encouraged, and a creative climate is established. The fourth learning skill, critical thinking, is successfully implemented when teachers utilize service learning opportunities, have a welcoming classroom environment, and challenge learners to critically think at developmentally appropriate levels.

## References

- Andzik, N. R., Chung, Y., & Kranak, M. P. (2016). Communication opportunities for elementary school students who use augmentative and alternative communication. *Augmentative and Alternative Communication, 32*(4), 272-281.
- Batchelor, K. E. & Bintz, W. P. (2013). Promoting creativity in the middle grades language arts classroom. *Middle School Journal, 45*(1), 3-11.
- Battelle for Kids. (2019). Framework for 21st century learning. Retrieved from [http://static.battelleforkids.org/documents/p21/P21\\_Framework\\_Brief.pdf](http://static.battelleforkids.org/documents/p21/P21_Framework_Brief.pdf).
- Becker, E. (2017). Strengthening collective efficacy through meaningful collaboration. (Master's thesis, Northwestern College, Orange City, IA). Retrieved from [https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1054&context=education\\_masters](https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1054&context=education_masters).
- Bongiorno, L. (n. d.) 10 things every parent should know about play. *National Association for the Education of Young Children*. Retrieved from <https://www.naeyc.org/our-work/families/10-things-every-parent-play>.
- Duncan, A. (2012). The power of debate—building the five c's for the 21<sup>st</sup> century. Retrieved from <https://www.ed.gov/news/speeches/power-debatebuilding-five-cs-21st-century>.
- Ferres, J. (2017). Communication efficiency in education: Increasing emotions and storytelling. *Media Education Research Journal, 25*(52), 51-60.
- Florea, N. M., Hurjui, E. (2015). Critical thinking in elementary school children. *Procedia, 180*, 565-572.
- Foutch, R. L., (2016). Peer partnerships and collaboration in the classroom setting and their effects on academic achievement (Master's thesis, Northwestern College, Orange City,

- IA). Retrieved from [http://nwcommons.nwciowa.edu/education\\_masters/10/](http://nwcommons.nwciowa.edu/education_masters/10/).
- Graziano, K. J. (2016). Peer teaching in teacher education classroom. *TechTrends*, 61, 121-129.
- Hitchcock, D. (2018). Critical thinking. *Stanford Encyclopedia of Philosophy*. Retrieved from <https://plato.stanford.edu/entries/critical-thinking/>.
- Institute for the Future for Dell Technologies. (2019). Future of Work: Forecasting emerging technologies' impact on work in the next era of human-machine partnership. *Institute for the Future*. Retrieved from [https://www.iftf.org/fileadmin/user\\_upload/images/ourwork/Tech\\_Horizons/realizing\\_2030\\_future\\_of\\_work\\_report\\_dell\\_technologies.pdf](https://www.iftf.org/fileadmin/user_upload/images/ourwork/Tech_Horizons/realizing_2030_future_of_work_report_dell_technologies.pdf)
- Jacobson, V. L. (2016, March). Pedagogical implementation of 21<sup>st</sup> century skills. *Educational Leadership and Administration: Teaching and Program Development*, 27, 82-100.
- Kettler, T. (2014). Critical thinking skills among elementary school students: Comparing identified gifted and general education student performance. *Gifted Child Quarterly*, 58(2), 127-136.
- Kim, S., Raza, M., & Seidman, E. (2019). Improving 21st-century teaching skills: The key to effective 21st-century learners. *Research in Comparative & International Education*, 14(1), 99-117.
- Kuhn, D. (2015). Thinking Together and Alone. *Educational Researcher*, 44(1), 46-53.
- Latta, M. M., Hanson, K., Ragoonaden, K., Briggs, W., & Middleton, T. (2017). Accessing the curricular play of critical and creative thinking. *Canadian Journal of Education*, 40(3), 191-218.
- Mathison, C. J. (2019). Choice-based learning in the art room. (Master's thesis, Northwestern College, Orange City, IA). Retrieved from



- [https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1167&context=education\\_masters](https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1167&context=education_masters).
- McDonald, G. (2012). Teaching critical and analytical thinking in high school biology. *The American Biology Teacher*, 74(3), 178-181.
- McGlynn, K. & Kozlowski, J. (2016). Empowering students through collaboration. *Science Scope*, 40(4), 64-67.
- Minnesota Department of Education. (2018). Minnesota state ESSA plan- Title IV, Part B: 21<sup>st</sup> century community learning centers. Retrieved from <https://education.mn.gov/MDE/dse/ESSA/mnstp/>.
- Mueller, K. (2019). How mindsets impact learning (Master's thesis, Northwestern College, Orange City, IA). Retrieved from [https://nwcommons.nwciowa.edu/education\\_masters](https://nwcommons.nwciowa.edu/education_masters)
- Nunn, J. A. & Braud, J. (2013). A service-learning project on volcanoes to promote critical thinking and the earth science literacy initiative. *Journal of Geoscience Education*, 61(1), 28-36.
- Onyema, O. G., & Daniil, P. (2017). Educating the 21st century learners: are educators using appropriate learning models for honing skills in the mobile age? *Journal of Entrepreneurship Education*, 20(2), 1-15.
- Ponder, J., Vander Veldt, M., Lewis-Ferrel, G. (2011). Citizenship, curriculum, and critical thinking beyond the four walls of the classroom: Linking the academic content with service-learning. *Teacher Education Quarterly*, 38(4), p. 45-68.
- Prenger, R., Poortman, C., & Handelzalts, A. (2019). The effects of networked professional learning communities. *Journal of Teacher Education*, 70(5), 441-452.
- Reading and Writing for Critical Thinking International Consortium. (2011). Vision, Mission &

Goals. Retrieved from <https://www.rwctic.org/about2>

Saaverdra, A. R. & Opfer, V. D. (2012). Learning 21<sup>st</sup>-century skills requires 21<sup>st</sup>-century teaching. *Phi Delta Kappan*, 94(2), 8-13.

Stone, D. L. (2015). Art teachers' beliefs about creativity. *Visual Arts Research*, 41(2), 82-100.

Sugito, S. M. (2017). Enhancing students' communication skills through problem posing and presentation. *International Journal of Evaluation and Research in Education*, 6(1), 17-22.

Wilson, M. B. (2012). *Interactive modeling: A powerful technique for teaching children*. Northeast Foundation for Children: Turner Falls, MA.