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EdTPA Preparation: Differences between Early and Full Implementation Groups

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Abstract

The purpose of the study was to determine if there are significant differences in Capstone Internship students' beliefs about the edTPA concerning future teaching practice and the helpfulness of provided supports between early implementation (spring 2019 and fall 2019, n=47) and full implementation (spring 2020, fall 2020, and spring 2021, n=59) groups upon edTPA portfolio completion. The early implementation groups were provided four edTPA supports that represented an early understanding of the edTPA by both students and faculty: one-hour Professional Education Programs office (PEP) seminar introduction to the edTPA, two-hour training by the edTPA coordinator, one-hour lesson videos training, and a task item checklist organized by tasks. The full implementation groups were provided four edTPA supports that represented a more profound understanding of the edTPA by both students and faculty: two-hour PEP seminar introduction to the edTPA, six-hour training by the edTPA coordinator, two-hour lesson videos training, and a task item checklist organized by week. Both groups completed a post-project survey that consisted of 15 questions in a Likert-style format with three questions specifically addressing their future teaching practice and the helpfulness of provided supports post-completion of the edTPA performance assessment. Independent samples t-tests statistics were performed comparing the mean scores of beliefs about the edTPA between the early implementation and full implementation groups on the post-project surveys. This study shows no significant differences in Capstone Internship students' beliefs about the edTPA concerning future teaching practice and the helpfulness of three of the four provided supports between early implementation and full implementation groups upon edTPA portfolio completion. One support, the task item checklist, was considered significantly more helpful by the early implementation group than the full implementation group.

Introduction

The Educative Teacher Performance Assessment (edTPA) is a national performance assessment widely used to measure effective teaching practice in teacher candidates. It is most often completed during the teacher candidate's capstone internship experience (Traver, 2017). A passing score on the edTPA indicates that teacher candidates are prepared to become professional educators (Gary, Thomas, & Miller, 2020; De Voto, Olson, & Gottlieb, 2021). The edTPA asserts to measure the act of "teaching" and its impact on student learning (Sato, 2014). Implementing a performance-based assessment in an educator preparation program takes the faculty working together to retool the curriculum and establish a system of supports for teacher candidates (Barron, 2015). Teacher educators should provide multiple supports to further develop teacher candidates' knowledge and skills, ultimately leading to completing the edTPA and improved p-12 student learning (Tanguay, 2020).

The purpose of the study was to determine if there are significant differences in Capstone Internship students' beliefs about the edTPA concerning future teaching practice and the helpfulness of provided supports between early implementation (spring 2019 and fall 2019, n=47) and full implementation (spring 2020, fall 2020, and spring 2021, n=59) groups upon edTPA portfolio completion. In addition, the study was designed to answer the following research questions:

1. Is there a significant difference in Capstone Internship students' beliefs regarding which provided edTPA supports are most helpful between the early implementation and full implementation groups?
2. Is there a significant difference in Capstone Internship students' beliefs that participating in the edTPA will lead to stronger teaching between the early implementation and full implementation groups?
3. Is there a significant difference in Capstone Internship students' beliefs that by participating in the edTPA, they will be better prepared as teachers between the early implementation and full implementation groups?

Review of Literature

edTPA Underlying Concepts

The edTPA is a national performance assessment used to measure effective teaching practice typically completed during the teacher candidate's capstone internship experience (Traver, 2017). It is touted as a tool of education reform to place highly qualified teachers in classrooms to teach on day one (Burns, Henry, & Lindauer, 2015; Clark-Gareca, 2015; and York, 2019). A passing score on the edTPA indicates that teacher candidates are equipped with the tools and expertise required of professional educators (Gary, Thomas, & Miller, 2020; De Voto, Olson, & Gottlieb, 2021). The edTPA has been adopted by more than 900 teacher preparation programs across 41 states and the District of Columbia (Davis, Mountjoy, & Palmer, 2016; Petchauer, Bowe, & Wilson, 2018; De Voto, Olson, & Gottlieb, 2021).

The edTPA is based on 15 elements of teaching practice situated within three main tasks: planning, instruction, and assessment (Clark-Gareca, 2015; York, 2019). Teacher candidates are evaluated on their capacity to cultivate p-12 students' academic language, defend their instructional decisions, and analyze their teaching practice through written reflection substantiated by data and artifacts (York, 2019). Teacher candidates assemble an extensive portfolio comprised of three to five consecutive lessons with a focus on planning, instruction, and assessment supported by artifacts such as lesson plans, instructional materials, student work samples, feedback provided to students, and video clips of classroom teaching (Sato, 2014; York, 2019; Gary et al., 2020; Tanguay, 2020). Portfolios can total up to 50 pages or more (Clark-Gareca, 2015; Gitomer, Martinez, Battey, & Hyland, 2021).

Supporters of the edTPA claim that establishing and expecting high standards for teacher candidates will equate to high-quality teaching resulting in increased student achievement, affording teacher education preparation programs with valuable data that will lead to continuous improvement and advance the profession (Tigert, Kidwell, Budde, Guzman, Lawyer, & Peercy, 2018). Fundamental to gauging teacher performance is measuring their impact on student learning, which the edTPA asserts to do, thereby ascertaining the act of "teaching" does lead to identifiable student learning (Sato, 2014). It is anticipated that as teacher candidates design, implement, and evaluate their instruction, they reflect upon the repeated relationship among planning, instruction, and assessment, with the primary focus being students' learning needs (Swars Auslander, Smith, Smith, & Myers, 2020).

Detractors of the edTPA argue that the use of high-stakes assessment in teacher education is inappropriate, demanding, and counterproductive in fostering collaboration and participation to develop effective practice (Bhatanagar, Kim, & Many, 2015; Darling-Hammond & Hyler 2021; and Gitomer et al., 2021). There is also substantial debate concerning the standardization of teacher preparation, predominantly if there is an essential body of knowledge and skills that

teachers should know and be able to do before being bestowed a license to teach (Sato, 2014). Lastly, numerous arguments center around outsourcing the evaluation of teacher candidates to corporate bodies can lead to a loss of professional sovereignty and decision-making regarding policy (Bhatanagar et al., 2015; and Tanguay, 2020).

edTPA Supports

Novice teachers must be knowledgeable in content, pedagogy, and the use of data to gauge student progress and render instructional decisions (Muth, Kremer, Keiper, Schnake, & MacCudden, 2018). To enhance the educational experience for all students in p-12 classrooms, educator preparation providers should support teacher candidates in their field experiences by exposing them to and utilizing best practices, now more than ever in this era of high stakes assessments such as the edTPA (Kissau, Hart, & Algozzine, 2019). Implementing a performance-based assessment in an educator preparation program takes the faculty working together to retool the curriculum and an established support system, including seminars, training, and opportunities to collaborate with peers (Barron, 2015).

While several studies have provided recommendations for varied supports that scaffold teacher candidates on completing the edTPA, few have investigated whether these support strategies are effective in doing so (Kissau et al., 2019). Teacher educators in one study acknowledged the beneficial use of a weekly pacing timeline to aid candidates in time management (Tanguay, 2020). Van Es and Conroy asserted that teacher candidates needed supports to develop an understanding of p-12 students' thinking, to describe trends and patterns in students' learning, and to be reflective writers about their experiences in completing teacher performance assessments (Tanguay, 2020). In another study, teacher candidates pinpointed supports they had found useful in completing the edTPA, including completing a mock-edTPA, engaging in edTPA discussions with peers, and participating in edTPA-focused seminars (Muth et al., 2018). Two additional studies suggest that teacher candidate achievement on the edTPA is influenced by three distinct elements: in-depth faculty knowledge, teacher candidate preparation through program coursework, and teacher candidate supports during edTPA completion (Davis et al., 2016).

To promote teacher candidate development, teacher educators should provide multiple supports in an effort to decrease stress while promoting the development of teacher candidates' knowledge and skills, ultimately leading to completing the edTPA (Tanguay, 2020). Abundant opportunities for scaffolded practice focusing on assessment, differentiation, and reflection should be embedded within multiple courses across teacher preparation programs to ensure students develop familiarity with the edTPA assessment long before their internship semester (Davis et al., 2016; Tanguay, 2020). One sentiment seems to resonate repeatedly: the more in-depth the faculty member's understanding of the data, the more valuable the teacher candidate preparation will be (Davis et al., 2016).

Good Teaching

Research regularly indicates that an effective teacher is the single-greatest school-based factor impacting student learning (Campbell, Ayala, Railsback, Freking, McKenna, & Lausch, 2016; Traver, 2017). Conversely, children who endure multiple years of low-quality teaching fall further behind, and their chances for lifelong success are acutely lessened (Whittaker, Pecheone, & Stansbury, 2018). In fact, several researchers have solid studies confirming the strong relationship between increased student achievement and the quality of teaching in the classroom

(Traver, 2017). After all, teacher effectiveness is not assessed by teacher content knowledge, instructional actions, or pedagogical competence but by measures of student learning based on the teaching (Traver, 2017). For example, a large-scale study by Goldhaber (2007) revealed an effect size of 1.4 accredited to teacher quality. An additional study by Rivkin et al. (2000) discovered an effect size of 0.6-0.7, while a similar study by Rockoff (2004) revealed an effect size of 0.6 (Traver, 2017). Even so, attempts to define what "good" in "good teaching" amounts to proves hard to enumerate (Gary, 2015).

Shulman (1998) lays out six qualities that endorse all professions and posits that education as a profession is progressively taking on the challenges of teacher candidate preparation with increased importance on the connections between theory and practice (Sato, 2014). Shulman's six qualities are the obligation of a 'calling'; an awareness of scholarship and theory; skilled practice; using judgment in uncertainty; learning from experience as theory meets practice; and a community that oversees quality and amasses knowledge (Sato, 2014; Traver, 2017). The edTPA frames teaching as a professional endeavor for teacher candidates as well as holistically for the field of teacher education. The edTPA assessment epitomizes all six criteria of a profession as laid out by Shulman's research (Sato, 2014). It was created "to ensure that young and inexperienced teachers are prepared to meet the varied academic needs of all students" (Heil & Berg, 2017).

Methodology

Purpose

The purpose of the study was to determine if there are significant differences in Capstone Internship students' beliefs about the edTPA concerning future teaching practice and the helpfulness of provided supports between early implementation (spring 2019 and fall 2019, n=47) and full implementation (spring 2020, fall 2020, and spring 2021, n=59) groups upon edTPA portfolio completion. In addition, the study was designed to answer the following research questions:

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2. Is there a significant difference in Capstone Internship students' beliefs that participating in the edTPA will lead to stronger teaching between the early implementation and full implementation groups?
3. Is there a significant difference in Capstone Internship students' beliefs that by participating in the edTPA, they will be better prepared as teachers between the early implementation and full implementation groups?

Selected questions were analyzed using data gathered from the results of the survey. In addition, independent samples t-tests statistics were calculated in SPSS, comparing the mean scores of beliefs of the edTPA between the early implementation and full implementation groups on a post-survey upon edTPA portfolio completion. All statistics were performed simultaneously to reduce the possibility of generating a statistically significant result when performing multiple t-tests and limit the risk of error (as shown in Table 1).

Table 1

Descriptive statistics for each survey question by semester

Group	*N*		*Q.6.1*	*Q.6.2*	*Q.6.4*	*Q.6.6.*	*Q.12*	*Q.14.5*	*Q.14.7*	*Q.14.8*
Spring 2019	29									
		M	1.84	2.13	3.00	1.68	2.08	2.39	2.59	2.76
		SD	0.99	0.96	0.88	0.95	0.80	1.31	1.27	1.27
Fall 2019	18									
		M	2.29	2.06	2.56	1.82	2.29	1.55	2.06	2.18
		SD	0.99	0.94	0.86	0.95	0.77	0.70	1.20	1.29
Spring 2020	23									
		M	2.59	1.39	2.73	1.09	2.57	1.83	2.30	2.26
		SD	0.91	0.66	0.94	0.29	0.68	1.11	1.33	1.60
Fall 2020	15									
		M	2.47	2.27	2.80	1.47	2.00	2.21	3.00	3.20
		SD	0.74	0.96	1.01	0.64	0.63	0.80	1.25	1.32
Spring 2021	21									
		M	2.24	2.05	2.90	1.81	1.67	2.43	3.05	3.38
		SD	1.00	0.97	0.85	0.98	0.86	1.36	1.56	1.53

Participants of the Study

Undergraduate students enrolled in the senior Capstone Internship course were surveyed to determine their beliefs about the edTPA concerning future teaching practice and the helpfulness of provided supports between early implementation and full implementation groups. A total of 106 students over five semesters completed a post-project survey. Demographic information was collected from all participants (as shown in Table 2). There were 105 females and one male. Participant ages ranged from 18-44 years. Of the 106 participants, 97 identified as White, seven identified as Black, and two identified as Hispanic. There were 58 students who completed an Elementary Literacy portfolio, and 48 completed an Elementary Math. The early implementation group consisted of students in the spring 2019 and fall 2019 semesters for 47 participants. This group comprised the first two groups of students to complete the edTPA portfolio assessment in the program, with no front-end loading of concepts provided prior to the capstone semester. In addition, the faculty possessed limited knowledge of the assessment, having no formal training prior to the spring 2019 semester and one two-hour training over the

summer prior to the fall 2019 semester. The full implementation group consisted of students in spring 2020, fall 2020, and spring 2021 semesters for 59 participants. This group consisted of students who had previous coursework embedded with edTPA concepts and structure and were provided more focused and intensive seminar sessions. The faculty were much more advanced in their edTPA concepts and structure and able to provide more guidance and support before, during, and after the edTPA assessment with the full implementation group. The early implementation groups were provided four edTPA supports that represented an early understanding of the edTPA by both students and faculty: one-hour Professional Education Programs office (PEP) seminar introduction to the edTPA, two-hour training by the edTPA coordinator, one-hour lesson videos training, and a task item checklist organized by tasks. The full implementation groups were provided four edTPA supports that represented a more profound understanding of the edTPA by both students and faculty: two-hour PEP seminar introduction to the edTPA, six-hour training by the edTPA coordinator, two-hour lesson videos training, and a task item checklist organized by week.

Table 2

Demographics by semester

Group	N	Gender		Age			Race			Content Area	
		Female	*Male*	*18-24*	*25-34*	*35-44*	*White*	*Black*	*Hispanic*	*Literacy*	*Math*
Spring 2019	29	29	0	22	6	1	27	1	1	20	9
		100%	0%	76%	21%	3%	93%	3%	3%	69%	31%
Fall 2019	18	17	1	17	1	0	16	2	0	9	9
		94%	6%	94%	6%	0%	89%	11%	0%	50%	50%
Spring 2020	23	23	0	17	5	1	22	0	1	12	11
		100%	0%	74%	22%	4%	96%	0%	4%	52%	48%
Fall 2020	15	15	0	15	0	0	14	1	0	10	5
		100%	0%	100	0%	0%	93%	7%	0%	67%	33%
Spring 2021	21	21	0	17	2	2	18	3	0	7	14
		100%	0%	80%	10%	10%	86%	14%	0%	33%	67%
Total	106	105	1	88	14	4	97	7	2	58	48
		99%	1%	83%	13%	4%	92%	6%	2%	55%	45%

The Survey

Senior Capstone Internship students completed the Capstone Internship edTPA Survey (Appendix A) in Google Forms. Content validity was established by administering the survey to five groups of students over five semesters of the course upon edTPA portfolio completion. The survey consisted of 15 questions in a Likert-style format with three questions specifically addressing their future teaching practice and the helpfulness of provided supports post-completion of the edTPA performance assessment. Questions 1-5 collected demographic information. Question 6 asked participants to rate their perceptions of the edTPA at that point in time. Question 7 asked participants to rate the provided support measures from the EPP were most helpful in completing the edTPA. Questions 8 through 12 sought to determine the participants' beliefs regarding the difficulty of the three tasks and 15 sub-tasks. Question 13 asked participants if they believed that their teaching practice would be stronger by participating in the edTPA process. Question 14 dealt with the benefit of resources available to participants. Question 15 asked participants to rank specific ways that completing the edTPA will help prepare them as a teacher. Survey question 7, sub-questions 1, 2, 4, and 6 were used to answer research question 1. Survey question 13 was used to answer research question 2. Survey question 15, sub-questions 5, 7, and 8 were used to answer research question 3.

Results

The purpose of the study was to determine if there are significant differences in Capstone Internship students' beliefs about the edTPA in relation to future teaching practice and the helpfulness of provided supports between early implementation (spring 2019 and fall 2019, n=47) and full implementation (spring 2020, fall 2020, and spring 2021, n=59) groups upon edTPA portfolio completion. In order to ascertain if the data across semesters could collapse to create two composite groups (early and full) from the five semesters surveyed in 2019, 2020, and 2021, a preliminary data analysis was conducted to determine if there were any differences between semesters within the anticipated groups. There were no significant differences between semesters within the anticipated groups, so the data was collapsed, and statistical analyses were performed to answer the study's three research questions.

Research Question 1: Is there a significant difference in Capstone Internship students' beliefs regarding which provided edTPA supports are most helpful between the early implementation and full implementation groups?

Independent samples t-tests statistics were calculated in SPSS with an established significance level of p=.05, comparing the mean scores of students' beliefs about the edTPA regarding the overall helpfulness of provided supports (PEP seminar, edTPA Coordinator training, video training, and task item checklist) between the early implementation and full implementation groups in a post-survey (as shown in Table 3). There were no significant differences in the scores between the early implementation (M=8.84, SD=2.38) and full implementation groups (M=8.43, SD=2.01) regarding the overall helpfulness of provided supports; t(93)=.89, p=.375. There is no difference in the students' beliefs regarding the overall helpfulness of provided supports between the early and full implementation groups.

Table 3

Independent samples t-tests comparing students' beliefs regarding the overall helpfulness of the provided edTPA supports

Group	*N*	*M*	*SD*	*t*	*df*	*p*
Early	38	8.84	2.38	0.89	93	0.375
Full	57	8.44	2.01			

The data was then broken down to the four like supports between the two groups (as shown in Table 4). There was a significant difference in the scores between the early implementation (M=1.79, SD=.99) and full implementation groups (M=1.44, SD=.75) regarding the weekly task item checklist provided by the Education Preparation Provider (EPP) edTPA Coordinator as being the most helpful support; t(100) =2.03, p=.045. Students belonging to the early implementation group consider the task item checklist provided by the EPP edTPA Coordinator as more helpful than the full implementation group. There were no significant differences in the scores between the early implementation and full implementation groups regarding the helpfulness of the other three supports: PEP seminar, edTPA Coordinator training, and video training.

Table 4

Independent samples t-tests comparing students' beliefs between the two composite groups regarding which of the four like edTPA supports provided are most helpful.

Question	*Group*	*N*	*M*	*SD*	*t*	*df*	*p*
Q.6.1	Early	42	2.02	0.99	-1.87	98	0.065
	Full	58	2.38	0.89			
Q.6.2	Early	42	2.10	0.93	1.32	99	0.190
	Full	59	1.85	0.93			

Q.6.4	Early	42	2.81	0.89	0.01	97	0.990
	Full	57	2.81	0.91			
Q.6.6	Early	43	1.79	0.99	2.03	100	0.045
	Full	59	1.44	0.75			

Research Question 2: Is there a significant difference in Capstone Internship students' beliefs that participating in the edTPA will lead to stronger teaching between the early implementation and full implementation groups?

Independent samples t-tests statistics were calculated in SPSS with an established significance level of p=.05, comparing the mean scores of students' beliefs that participating in the edTPA will lead to stronger teaching practice between the early implementation and full implementation groups in a post-survey (as shown in Table 5). There were no significant differences in the scores between the early implementation (M=2.89, SD=.99) and full implementation groups (M=2.91, SD=.99) regarding beliefs that participating in the edTPA will lead to stronger teaching practice; t(102)=-.11, p=.909. There is no difference in the students' beliefs that participating in the edTPA will lead to stronger teaching practice between the early implementation and full implementation groups.

Table 5

Independent samples t-tests comparing students' beliefs that participating in the edTPA will lead to stronger teaching

Group	*N*	*M*	*SD*	*t*	*df*	*p*
Early	46	2.89	0.993	-0.114	102	0.909
Full	58	2.91	0.996			

Research Question 3: Is there a significant difference in Capstone Internship students' beliefs that by participating in the edTPA, they will be better prepared as teachers between the early implementation and full implementation groups?

Independent samples t-tests statistics were calculated in SPSS with an established significance level of p=.05, comparing the mean scores regarding students' beliefs that by participating in the edTPA, they will be better prepared as teachers between the early implementation and full implementation groups in a post-survey (as shown in Table 6). There were no significant differences in the scores between the early implementation (M=7.11, SD=3.44) and full implementation groups (M=8.05, SD=3.87) regarding beliefs that participating in the edTPA they will be better prepared as teachers; t(103)=-1.30, p=.197. There

is no difference in the students' beliefs that by participating in the edTPA, they will be better prepared as teachers between the early implementation and full implementation groups.

Table 6

Independent samples t-tests comparing students' beliefs that by participating in the edTPA, they will be better prepared as teachers

Group	*N*	*M*	*SD*	*t*	*df*	*p*
Early	46	7.11	3.44	-.130	103	0.197
Full	59	8.10	3.87			

The data was then broken down into the three specific ways that completing the edTPA will help prepare them as a teacher (to reflect more carefully on instructional decisions, be a more effective teacher, and be useful for future practice) between the two groups (as shown in Table 7). There were no significant differences in the scores between the early implementation and full implementation groups regarding the three specific ways that completing the edTPA will help prepare them as a teacher.

Table 7

Independent samples t-tests comparing students' beliefs between the two composite groups regarding three specific ways that completing the edTPA will help prepare them as a teacher

Question	*Group*	*N*	*M*	*SD*	*t*	*df*	*p*
Q.14.5	Early	46	2.17	1.23	-1.28	103	0.205
	Full	59	2.51	1.41			
Q.14.7	Early	46	2.40	1.26	-1.62	103	0.109
	Full	59	2.81	1.38			
Q.14.8	Early	46	2.54	1.29	-0.66	103	0.512
	Full	59	2.73	1.53			

Discussion

Seeing no difference in the students' beliefs regarding the helpfulness of provided supports between the early implementation and full implementation groups is reassuring to faculty. Even when faculty knowledge and understanding were limited and provided supports were minimal, students felt the provided supports as a whole were helpful in completing the edTPA portfolio. Students belonging to the early implementation group considered the weekly task item checklist provided by the EPP edTPA Coordinator as more helpful than the full implementation group. The early implementation groups had little to no front-end loading of edTPA concepts embedded in coursework. The program curriculum was not yet mapped out to align the edTPA portfolio assessment and coursework. This early cohort of students needed the task checklist to act as a "mind-map" of sorts, serving as a guide from start to finish, checking off each bite-size task along the way.

On question 13, students were asked if they believed that by participating in the edTPA process, their practice as a teacher would be stronger. Answer options were 'yes, 'no',' maybe', and 'I do not know'. There was no significant difference in students' beliefs that participating in the edTPA will lead to stronger teaching practice between the early implementation and full implementation groups. There were significantly large fluctuations in each of the four survey responses when looking at the five cohorts of students independent of each other. Response percentages ranged from 0% to 60.9%, showing extreme variances with no identifiable cause or variable. However, when looking at just the two groups, early implementation and full implementation, the percentages for answer options are comparable in all four response options, ranging in differences from .9% to 7.2%. This seems to show that regardless of faculty's provided support and knowledge, and expertise, there is minimal variance in students' beliefs that participation in the edTPA equals stronger teaching practice. When asked if completing the edTPA would help respondents reflect more carefully on instructional decisions as a teacher (question 15, sub-question 5), both early implementation and fall implementation groups overwhelmingly agreed with 69.4% and 63.7%, respectively (those who answered agree and absolutely agree combined). This is more than likely due to the reflective emphasis the task commentaries require of students as part of the edTPA assessment portfolio.

While this study sufficiently answers the three research questions posed, there exist some limitations. The Covid-19 pandemic interfered with all three internship experiences, causing two groups to complete their edTPA portfolio assessment in a virtual environment. The difficulties presented by this include the lack of face-to-face interaction with students in a real classroom, the lack of training and technical knowledge of teachers to design online learning content with little to no preparation time, and the stress and anxiety caused by this once in a lifetime event, compounding an already challenging performance assessment. The most consistent thing in education over the last three semesters has been its inconsistent execution. Another limitation is the lack of previous research on the success of provided support to teacher candidates during the edTPA portfolio assessment. Some studies offer recommendations for supports that scaffold teacher candidates on completing the edTPA; few exist that offer insight into whether these supports are effective (Kissau et al., 2019). It would be beneficial to teacher preparation programs to garner practical experiences of those who design and implement successful supports that lead to higher scores on the assessment, and more importantly, improved student learning in our p-12 classrooms.

Conclusion

This study sought to determine if there are significant differences in Capstone Internship students' beliefs about the edTPA in relation to future teaching practice and the helpfulness of provided supports between early implementation and full implementation groups upon edTPA portfolio completion. Implementing a performance-based assessment in an educator preparation program is no easy task. It takes a lot of work and time, requiring both faculty and students to buy into the process. It can also feel like an all-encompassing task—having tendrils in all areas from curriculum to programming to licensure. Therefore, it would behoove educator preparation programs to share their successes and failures, collect robust and relevant data surrounding implementation, and examine students' perceptions and beliefs about the process from beginning to end. Revealing the practical experiences of faculty and students regarding the edTPA performance assessment will result in exponential gains, advancing the profession and producing effective teachers for all students.

References

Bhatnagar, R., Kim, J., & Many, J. E. (2015). *An instrument to study the state-wide implementation of edTPA: validating the edTPA levels of integration survey*. Georgia Educational Research Association Conference. https://digitalcommons.georgiasouthern.edu/gera/2015/2015/18.

Burns, B. A., Henry, J. J., & Lindauer, J. R. (2015). Working together to foster candidate success on the edTPA. *Journal of Inquiry and Action in Education, 6*(2). https://digitalcommons.buffalostate.edu/jiae/vol6/iss2/2

Campbell, C., Ayala, C. C., Railsback, G., Freking, F. W., McKenna, C., & Lausch, D. (2016). Beginning teachers' perceptions of the California teaching performance assessment (TPA). *Teacher Education Quarterly, 43*(2), 51-71.

Clark-Gareca, B. (2015). Where practicum meets test preparation: supporting teacher candidates through EdTPA. *The CATESOL Journal, 27*, 211-220.

Darling-Hammond, L., & Hyler, M. E. (2021). *The role of performance assessment in developing teaching as a profession. Rethinking Schools*. 27 (4). https://rethinkingschools.org/articles/the-role-of-performance-assessment-in-developing-teaching-as-a-profession/

Davis, T. S., Mountjoy, K. J., & Palmer, E. L. (2016). Creating an instructional framework to prepare teacher education candidates for success on a performance-based assessment. *The Journal of Research in Business Education, 57*(2), 1.

De Voto, C., & Thomas, M.K. (2020). Cultural sensemaking and the implementation of edTPA technological tools: Lessons for the field. *Education Tech Research Dev 68*, 2729–2751. https://doi.org/10.1007/s11423-019-09732-w

De Voto, C., Olson, J. D., & Gottlieb, J. J. (2021). Examining diverse perspectives of edTPA policy implementation across states: The good, the bad, and the ugly. *Journal of Teacher Education, 72*(1), 42-55. https://doi.org/10.1177/0022487120909390

DiBello, K.S., Williams, K. G., Patterson, T. T., Culver, T., Batts, A., McClure, A., & Fuqua, S. (2018). Preparing teacher candidates using a collaborative residency model. *Journal of Education & Social Policy, 5*(4). http://jespnet.com/journals/Vol_5_No_4_December_2018/24.pdf

Gary, D. (2015). What is a "good teacher"? Does "good" resonate with the edTPA? *Northwest Journal of Teacher Education ONLINE*. https://nwate.com/category/northwest-journal-of-teacher-education-online/

Gitomer, D. H., Martínez, J. F., Battey, D., & Hyland, N. E. (2021). Assessing the assessment: evidence of reliability and validity in the edTPA. *American Educational Research Journal, 58*(1), 3-31. https://doi.org/10.3102/0002831219890608

Heil, L., & Berg, M. H. (2017). Something happened on the way to completing the edTPA: A case study of teacher candidates' perceptions of the edTPA. *Contributions to Music Education, 42*, 181-200.

Kissau, S., Hart, L. C., & Algozzine, B. (2019). Investigating the impact of edTPA professional development on classroom practice and student teaching experience. *Journal of Teacher Education, 70*(2), 102-114. https://doi.org/10.1177/0022487117721706

Muth, N., Kremer, K., Keiper, V., Schnake, R., & MacCudden, R. (2018). Implementation of edTPA Completion Prior to Student Teaching. *Mid-Western Educational Researcher, 30*(3), 71-92. https://www.mwera.org/MWER/volumes/v30/issue3/V30n3-Muth-FEATURE-ARTICLE.pdf

Petchauer, E., Bowe, A. G., & Wilson, J. (2018). Winter is coming: Forecasting the impact of edTPA on black teachers and teachers of color. *The Urban Review, 50*(2), 323-343. https://doi.org/10.1007/s11256-018-0453-1

Sato, M. (2014). What is the underlying conception of teaching of the edTPA? *Journal of Teacher Education, 65*(5), 421-434. https://doi.org/10.1177/0022487114542518

Swars Auslander, S., Smith, S. Z., Smith, M. E., & Myers, K. (2020). A case study of elementary teacher candidates' preparation for a high stakes teacher performance assessment. *Journal of Mathematics Teacher Education, 23*(3), 269-291. https://doi.org/10.1007/s10857-018-09422-z

Tanguay, C. L. (2020). High-stakes assessment in elementary education teacher preparation: Educators' perceptions and actions resulting in curriculum change. *Education Policy Analysis Archives, 28*, 53. https://doi.org/10.14507/epaa.28.4840

Tigert, J., Kidwell, T., Budde, C., Guzman, N., Lawyer, M., & Peercy, M. (2018). "It took my knowledge to the limits": The edTPA teacher performance assessment and its implications for TESOL. *Teacher Learning and Professional Development, 3*(1), 19-38. https://www.researchgate.net/publication/327511354_It_took_my_knowledge_to_the_limits_The_edTPA_teacher_performance_assessment_and_its_implications_for_TESOL

Traver, J. J. (2017). An analysis of the relationship between teacher candidate performance assessment results and teaching quality at the end of the first year of teaching. *Culminating Projects in Education Administration and Leadership*, 24. https://repository.stcloudstate.edu/edad_etds/24

Whittaker, A., Pecheone, R. L., & Stansbury, K. (2018). Fulfilling our educative mission: A response to edTPA critique. *Education Policy Analysis Archives, 26*(30). https://doi.org/10.14507/epaa.26.3720

York, M. C. (2019). A Study of the Impact of Participating in the edTPA process on the Assessment Practices of Novice Teachers. *University of Portland Pilot Scholars Graduate Theses and Dissertations*. https://pilotscholars.up.edu/cgi/viewcontent.cgi?article=1074&context=etd

Appendix A

Capstone Internship edTPA Survey Instrument

Capstone Internship edTPA Survey

Please complete this survey for a research project we are doing on our implementation of the edTPA in our elementary education teacher preparation program. All information is confidential and will only be used for the purpose of this study.
Dr. Covey and Dr. Young

* Required

1. Email *

2. Gender *

Mark only one oval.

- Male
- Female
- Prefer not to say

3. Age *

Mark only one oval.

- 18-24
- 25-34
- 35-44
- 45-54
- 55+

4. Race *

Mark only one oval.

- African American
- Hispanic
- White
- Asian
- Multiracial
- American Indian
- Other: _____

5. Certification Area Assessment for edTPA *

Mark only one oval.

- Elementary Education LIteracy
- Elementary Education Math

6. Perceptions of the edTPA currently:

Mark only one oval per row.

	1 (Strongly Agree)	2	3	4	5 (Strongly Disagree)
The goals of the edTPA are clear.					
The edTPA is a fair assessment of my teaching practices.					
The goals of the edTPA are consistent with the goals of my teacher preparation program.					
The goals of the edTPA are consistent with my ideas of good teaching.					
The edTPA is a time consuming process.					

7. Which of the support measures, which were provided by AState, do you believe were most helpful to you in completing the edTPA? Please rank from 1 (most helpful) to 4 (least helpful).

Mark only one oval per row.

	1 (most helpful)	2	3	4 (least helpful)
Student Teacher/PEP Seminars				
Boot camp for edTPA tasks provided by the edTPA coordinator				
Seminar session on academic language provided by the edTPA coordinator				
Session on video recording/GoReact				
Internship Syllabus				
edTPA weekly task calendar/checklist				
ASU formative lesson plan template				
Feedback and support from Clinical Supervisor				
edTPA Google Drive				

8. Which set of tasks in the edTPA portfolio were most difficult to complete and follow? Please rank from 1 (least difficult) to 3 (most difficult).

Mark only one oval per row.

	1 (least difficult)	2	3 (most difficult)
Planning			
Instruction			
Assessment			

9. Which set of tasks in the edTPA process do you believe will help you improve your teaching the most? Please rank 1 (most helpful) to 3 (least helpful).

Mark only one oval per row.

	1 (most helpful)	2	3 (least helpful)
Planning			
Instruction			
Assessment			

10. Which of the following commentaries/tasks under "Planning--Task 1" do you believe were most difficult for you to complete? Please rank from 1 (least difficult) to 5 (most difficult).

Mark only one oval per row.

	1 (least difficult)	2	3	4	5 (most difficult)
Rubric 1--planning for understanding/learning					
Rubric 2--planning to support varied student learning needs					
Rubric 3--using knowledge of students to inform teaching and learning					
Rubric 4--identifying and supporting language demands					
Rubric 5--planning assessments to monitor and support student learning					

11. Which of the following commentaries/tasks under "Instruction--Task 2" do you believe were most difficult for you to complete? Please rank from 1 (least difficult) to 5 (most difficult).

Mark only one oval per row.

	1 (least difficult)	2	3	4	5 (most difficult)
Rubric 6--learning environment					
Rubric 7--engaging students in learning					
Rubric 8--deepening student learning					
Rubric 9--subject-specific pedagogy					
Rubric 10--analyzing teaching effectiveness					

12. Which of the following commentaries/tasks under "Assessment--Task 3" do you believe were most difficult for you to complete? Please rank from 1 (least difficult) to 5 (most difficult).

Mark only one oval per row.

	1 (least difficult)	2	3	4	5 (most difficult)
Rubric 11--analysis of student learning					
Rubric 12--providing feedback to guide learning					
Rubric 13--student understanding and use of feedback					
Rubric 14--analyzing students' language use					
Rubric 15--using assessment to inform instruction					

13. Do you believe by participating in the edTPA process your practice as a teacher will be stronger?

Mark only one oval.

- Yes
- No
- Maybe
- I just don't know....

14. In completing the edTPA, how beneficial were the resources listed below will be for you? Please rate from 1 (most beneficial) to 5 (least beneficial).

Mark only one oval per row.

	1 (most beneficial)	2	3	4	5 (least beneficial)
edTPA student assessment handbook					
Making Good Choices handbook					
Understanding Rubric Level Progressions handbook					
edTPA website					
edTPA commentary templates/word docs					
GoReact website tutorials					

15. How do you believe completing the edTPA will help prepare you as a teacher? Please rank from 1(Absolutely Agree) to 5 (Absolutely Disagree).

Mark only one oval per row.

	1 (Absolutely Agree)	2	3	4	5 (Absolutely Disagree)
It will help to improve my knowledge of the learning context, including my students, class and school					
It will help improve my lesson planning skills					
It will help improve my instruction skills					
It will help improve my skills of assessing students learning					
It will help me reflect more carefully on my instructional decisions					
It will enhance my teacher preparation (internship) experience					
It will help me be a more effective teacher.					
It will be useful for my future teaching practice.					
I believe the use of edTPA will improve the status of the teaching profession.					

Thank you!!!

Dr. Covey and Dr. Young

The Impact of Student Response Systems Technology in the University Classroom: Increasing Student Engagement and Retention

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Abstract

This research study utilizes a mixed methods design to explore the impact of a Student Response Systems application on the retention of content for participants in an undergraduate educational foundations course. A control and experimental group each completed a survey test, exploring the participants' application of practical knowledge related to the educational theories presented. Follow-up interviews are conducted with the experimental group, furthering the understanding of content knowledge retention as a result of utilizing the Student Response Systems technology. While statistically significant results are not determined, an increase in content knowledge and academic achievement is evident through the interview results. As such, this study supports the use of a learning strategy which has the potential to engage students who need additional support to prevent academic failure while increasing content knowledge retention.
Keywords: Student Response Systems, Student Engagement, Retention, Academic Achievement

Introduction

Student engagement and participation in the classroom is a vital part of understanding and retaining course content. Instructors in college-level courses look for ways to engage students and facilitate course content retention. The use of interactive gaming software in the classroom as a means of formative and summative assessments has increased over the past several years (Brookhart, 2004). Gaming software in the classroom is often used to enhance classroom participation and for assessment purposes (Brookhart, 2004). Summative and formative assessments are used to check for students' understanding, course retention, and grading. Classroom response systems, also known as Student Response Systems (SRS), are examples of gaming software that instructors have used in college classrooms (Wang et al., 2016). Popular game-based SRS are used to create a game-show atmosphere within a classroom setting (Wang et al., 2016). Web-based platforms that allow users, or students, to play interactive, multiple-choice games. SRS uses eye-catching graphics, special interaction, and audio to create a fun and competitive atmosphere. Game-based SRS are used by instructors to check students' knowledge of course content, create student-centered discussions, as well as increase participation in classroom settings (Wichadee & Pattanapichet, 2018). Game-based SRS technology has shown potential in improving assessment scores and classroom participation (Iwamoto et al., 2017). The aim of this study is to examine the results of using SRS technology in a university classroom setting for improving student engagement and content knowledge retention.

Theoretical Framework

Instructors are using game-based assessments as a means to better engage students in higher education classrooms (Andzik et al., 2019). Formative and summative assessments are commonly used in college classrooms to gauge students' skills, knowledge, and retention of course content (Brookhart, 2004). These assessments also provide instructors with information on students for grading purposes and performance in class (Bookhart, 2004). Game-based

learning and assessments have shown to increase students' motivation and content retention, which is critical in learning behavior (Schunk et al., 2013). Studies have shown that students tend to be more motivated and enthusiastic about learning when game-based learning and feedback are incorporated into the classroom (Wichadee & Pattanapinchet, 2018).

Implementing Student Responses Systems

Student Response Systems (SRS) can be used in many ways in the classroom as a means to integrate game-based learning into the university classroom. Some examples of using SRS include attendance, question, and answer (Q&A) constructs, multiple-choice responses, and student-centered discussions (Zucker & Fisch, 2019). While the concept of creating and playing games in the classroom is not new, SRS allows the teacher to quickly create professional-looking games with eye-catching graphics and contemporary music (Zucker & Fisch, 2019). SRS has been used to take seemingly dull subjects and make them exciting and engaging to students (Zucker & Fisch, 2019). A meta-analysis noted that educational games, such as those utilized through SRS, led to an increase in knowledge retention and motivation (Connolly et al., 2012). Game-based SRS has the potential to be effective in student engagement and course retention because it stimulates the visual and verbal components of processing (Woo, 2014).

Student Engagement

Student Response Systems (SRS) have been shown to increase classroom engagement as well as academic achievement (Wichadee & Pattanapichet, 2018). Dörnyei and Ushioda, (2011) observed that motivation is closely related to participation and engagement. When using game-based SRS student-centered strategies instead of a teacher-centered method of instruction, students tend to respond more positively (Andzik et al., 2019). When engagement is present, students exhibit increased participation, enthusiasm, and attentiveness, which results in better academic performance (Reeve, 2012).

The use of SRS creates friendly low-stakes competition within the classroom by using a real-time application (app) readily available on mobile devices such as a smartphone, iPad, or laptop (Wichadee & Pattanapinchet, 2018). By using a game-based platform, SRS allows instructors to create interactive quizzes or activities that students can complete on personal devices (Zucker & Fisch, 2019). This increased interaction and response by the students engages the student in the learning process while reinforcing content knowledge. To further enhance student engagement with the use of SRS, points are often given for correct answers and participating students receive immediate feedback to see results from responses. Game-based SRS has also shown to increase development in problem-solving skills through repeated practice, which prepares students to face challenges in other content areas (Gee, 2003).

In recent years, instructors have adapted Student Response Systems (SRS) Technology in the classroom. The purpose of embedding SRS is to increase classroom participation and retention of course content (Brookhart, 2004). The impact of SRS and its effects on student engagement has been examined. However, most studies focused on examining the general effects of game-based learning on K-12 students. The purpose of this study is to further research by determining if the use of SRS Technology positively impacts student engagement and content knowledge retention for university students who need additional support to prevent academic failure.

Research Methodology

This research study is a mixed-methods design, utilizing a control group and experimental group. The primary research question is as follows: What is the experience of SRS technology and content in a university classroom for students who need additional support to prevent academic failure?

The study addresses the additional research questions as well:

1. Is there a difference between the control group and experimental group after using SRS technology?
2. What is the perceived impact of SRS technology on the participant's experience?
3. How do students articulate the way teaching and learning theories related to educational practice?
4. What do students conceptualize as the major assumptions, ideas, vocabulary, or principles related to course content?

Participants

Undergraduate students from a comprehensive regional university participated in the study. Two groups of students were utilized as the participants in the study, one as the experimental group and one as the control group. Both groups of students were completing the same educational foundations course, taught by the same instructor while utilizing the same course materials and methods.

Student participants for the experimental and control groups were defined as needing additional support to prevent academic failure due to poor academic performance. As such, this study's participants consist of undergraduate educational foundations students who are determined as needing additional support to prevent academic failure. The undergraduate educational foundations course focuses on the basic principles of development from birth to adolescence. Students examine personal, social, and moral development. In addition, students investigate cognitive learning and motivation and address diverse backgrounds and exceptionalities.

In addition to the course materials, content, and methods provided by the instructor to the control group, the instructor also incorporated the Student Response System (SRS) Technology within the course for the experimental group only. Thirty-four were included in the study as the experimental group. Eighteen participated as the control group.

Methods

A Student Response Systems (SRS) Technology application was utilized to teach the educational theorists to the experimental group only. The control group did not receive instruction utilizing the SRS application. For the experimental group, the SRS application was embedded into the course content, allowing the students to participate in the class through the application using their cell phones. The SRS application utilized various response items such as multiple choice, short answer, fill-in the blank, and so on. Students responded throughout the class sessions to various questions to engage with the content.

A survey test was provided to the control group and the experimental group to determine the basic knowledge of the content matter from the educational foundations course. The survey test was used to assess students' knowledge of the top eight educational theorists taught in the course. Students' answers were focused on the major assumptions, ideas, vocabulary, or principles. The survey test was utilized to determine student participant's knowledge of content.

Follow-up interviews were conducted for the experimental group participants to gain a more thorough understanding of the impact of the Student Response System (SRS) on participants' content knowledge. Qualitative measurements of open-ended responses were added to strengthen the validity of this research for the experimental student participant group (Mertler, 2019). All open-ended questions were coded based on common themes from answers given (Andzik et al., 2019). Students were asked to include applications and implications for practice from each theorist. Students were given open-ended questions associated with major assumptions, ideas, vocabulary, or principles for theorists studied in the undergraduate educational foundations course. The open-ended questions were presented during the last three weeks of the course to gain an understanding of the cumulative retention the experimental group had from the semester's presentations along with the experience using the SRS application.

Data Analysis

Student participants in the control group and experimental group were provided with a survey test which asked the following questions: 1) Have you heard of this theorist before (followed by the theorist name)? 2) Major Assumptions, Ideas, Vocabulary, or Principles; and 3) Implications for Practice. An independent samples t-test is utilized to analyze the results of the survey test as the experimental group received the treatment, or instruction with the Student Response Systems technology, and the control group did not. There was no significant effect for the Student Response Systems technology intervention, $t(413)= 0.0160$, $p=0.9873$, despite the experimental group slightly attaining higher scores ($M=83.39$, $SD=37.28$) than the control group ($M=83.33$, $SD=37.40$) on the survey test.

The experimental group participated in an interview to determine further content knowledge experience as a result of the Student Response Systems technology on the participants. In the qualitative questionnaire and interviews, the emergent themes related to the theorists are presented. As Table 1 demonstrates, Piaget was the most notable theorist, followed by Vygotsky and others. The experimental group appeared to be able to name the theory associated with each developmental educational theorist, discuss the major assumptions of the theory, and be able to provide examples for the implication of practice for each theorist. This indicates that participants retained knowledge of the theorists and theories, leading to academic achievement for students in the experimental group. The exception was Erikson. Students were able to assert that Erikson proposed that people must be able to resolve one stage before advancing to the next sequential stage of his model theory. However, beyond that concept, students in this course seem to struggle with more specifics regarding Erikson's work. Students did articulate that if a person had not resolved an indicated stage, then they would need to continue strategies in the current stage. However, overall, the indication was an increase in content knowledge for the experimental group based upon the experience of utilizing the SRS technology.

Table 1

Emergent Themes from Open-ended Questions for Each Theorist Studied

Theorists	Themes		
Piaget	Cognitive Development	Learn by Doing	Language
Vygotsky	Sociocultural Learning	Learn by More Competent Other	Zone of Proximal Development
Gardner	Multiple Intelligence	Strengths and Weaknesses	Vary Teaching Strategies
Erikson	Psychosocial Development	Resolution of Current Stage	
Bandura	Social Cognitive Development	Self-Efficacy	Build Self-Esteem
Bronfenbrenner	Bioecological Model	Ecological Systems	Level of Support
Maslow	Hierarchy of Needs	Classroom Climate	Basic Needs First
Kohlberg	Moral Development	Social Rules	Use of Literature

N=34

Conclusions

Student Response Systems (SRS) technology provides an innovative means to engage students in the classroom and retain valuable content knowledge. Students are more engaged in the learning process in the classroom and actively interact with fellow classmates when utilizing the SRS application (Andzik et al., 2019). SRS technology was a positive contributing factor in student's academic success in the educational foundations course. While a statistically significant improvement in academic achievement was not indicated, the potential benefits of using SRS application in the university classroom are apparent through the interviews with the experimental group. A limitation in the study was the small sample size which may account for the lack of statistical significance. As such, SRS should be considered when preparing students for assessments and instruction based on the experiences indicated by the participants in the experimental group. The use of SRS gives students the opportunity to provide immediate feedback and develop effective study skills to instill better retention of essential content knowledge. Using SRS in the university classroom has the potential to make the content more meaningful by applying the content learned into a memorable experience.

Discussion

The use of Student Response Systems (SRS) provides a learning strategy which can engage students in the learning process while potentially increasing content knowledge retention. This has the possibility to increase academic achievement for learners who need additional support to prevent academic failure in the university classroom. Further research is needed on a

larger sample of students to determine any statistical significance related to the impact of the Student Response System technology on academic achievement. In addition, this study utilized one specific type of SRS technology. Additional research on multiple types of SRS technology to determine any significant differences among the specific brands or types of SRS technologies available would be beneficial.

The use of SRS is typically utilized in the face-to-face classroom, embedded within the lecture and discussion components of the classroom setting to support student learning. However, the use of SRS can be extended to the virtual online learning environment as well. The use of SRS can be utilized in synchronous discussions and lectures in the online classroom. Further research is needed to determine the impact of SRS on student engagement and content knowledge retention on learners who need additional support to prevent academic failure in the online learning environment.

References

Andzik, N.R., Gist, C.M., Smith, E.E., Xu, M., & Neef, N.A. (2019). The effects of gaming on university student quiz performance. *Journal of Effective Teaching in Higher Education, 2*(1), 109-119. https://files.eric.ed.gov/fulltext/EJ1214935.pdf

Brookhart, S.M. (2004). Assessment theory for college classrooms. *New Directions for Teaching and Learning*, *100*, 5-14. http://web.b.ebscohost.com.ezproxy.lib.uwf.edu/ehost/pdfviewer/pdfviewer?vid=3&sid=ef964c10-7a99-411a-aa97-7a4e5b73d149%40pdc-v-sessmgr02

Connolly, T. & Boyle, L. (2016). *Proceedings of the 10th European conference on games based learning*. [Conference session.] Academic Conferences and Publishing International, Paisley, Scotland.

Dörnyei, Z. & Ushioda, E. (2011). *Teaching and researching motivation* (2nd ed.) Pearson Education.

Gee, J.P. (2003). What video games have to teach us about learning and literacy. *Computers and Entertainment, 1*(1), 20.

Iwamoto, D.H., Hargis, J., Taitano, E.R., & Vuong, K. (2017). Analyzing the efficacy of the testing effects using Kahoot! ™ on student performance. *Turkish Online Journal of Distance Education-TOJDE*, *18*(2), 80-93. https://files.eric.ed.gov/fulltext/EJ1145220.pdf

Mertler, C.A. (2019). *Introduction to research* (2nd ed.). SAGE Publishers, Inc.

Reeve, J. (2012). A self-determination theory perspective on student engagement. In S.L. Christenson, A.L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149-172). Springer.

Schink, D.H., Meece, J.R., & Pintrich, P.R. (2013). *Motivation in education: Theory, research, and applications* (4th ed.). Pearson Education.

Wang, A. I., Zhu, M., & Sætre, R. (2016*). The effect of digitizing and gamifying quizzing in classrooms.* [Conference session]. Academic Conferences and Publishing International, Paisley, Scotland.

Wichadee, S. & Pattanapichet, F. (2018). Enhancement of performance and motivation through application of digital games in an English language class. *Teaching English with Technology, 18(1),* 77-92. https://files.eric.ed.gov/fulltext/EJ1170635.pdf

Woo, J.C. (2014). Digital game-based learning supports student motivation, cognitive

success, and performance outcomes. *Educational Technology & Society, 17*(3), 291-307.

Zucker, L. & Fisch, A.A. (2019). Playing and learning with Kahoot! ™: Enhancing collaboration and engagement in Grades 9-16 through digital games. *Journal of Language and Literacy Education, 15*(1), 1-15. https://files.eric.ed.gov/fulltext/EJ1212450.pdf

Aspects to Consider Towards Teaching for Understanding Across the Disciplines

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Abstract

Understanding is more than simply acquiring knowledge. How can teachers foster understanding for their students? As teachers begin to work towards this, there are many facets to consider and apply in the classroom. Through a collection of various frameworks related to instruction of mathematics, social studies, English, foreign language, and English as a Second Language (ESL), the authors outline specific disciplinary elements to consider when attempting to teach for understanding. While there are many elements that contribute, this paper focuses on three: types of knowledge, task selection, and classroom environment. Ultimately, the authors hope to support more humanizing practices of teaching that encourage teachers towards a dialogical learning environment that cultivates self-directed, sustained learning in students.

Introduction

Understanding is more than simply acquiring knowledge. Perkins (2014) asserts, "to show understanding, people need to think through, about, and with the topic, and do so rather well. When all people can do is recite or manage straightforward exercises or trip over misconceptions and stereotypes, they don't really understand" (p. 101). Similarly, while Blythe (1998) describes knowledge as the ability to recall information or demonstrate a skill, understanding, rather, "is a matter of being able to do a variety of thought-provoking things with a topic, such as explaining, finding evidence, and examples, generalizing, applying analogizing, and representing the topic in new ways" (p. 12). True understanding, therefore, is multi-layered, malleable, useful within and across various contexts, and encourages students to apply their acquired knowledge outside of the boundaries of school (Misco, 2014). In other words, the train must lead somewhere (Dewey, 1910).

Although the authors of this paper acknowledge the interdisciplinary, generalizable elements of teaching for understanding across the disciplines, we are also aware of how intimidating it can be for teachers to take these interdisciplinary elements and apply them to their own classrooms. Thus, through a collection of various frameworks related to instruction of mathematics, social studies, English, foreign language, and English as a Second Language (ESL), we outline specific disciplinary elements to consider when attempting to teach for understanding. Ultimately, the authors hope to support more humanizing practices of teaching that encourage teachers towards a dialogical learning environment that cultivates self-directed, sustained learning in students.

Literature Review

How do teachers cultivate understanding in students? Banks and Barlex (2014) argue "continually 'giving solutions' becomes a culture of the classroom at the expense of a 'problem-solving' culture" (p. 45). Students are not deepening their understanding when they expect to be

told answers instead of discovering them on their own. Posing challenging problems, linked to big questions, cultivates deeper learning (Misco, 2014). Moreover, as students become more engaged, research shows students experience deeper, sustained learning and understanding (Goldman & Pellegrino, 2015; National Academies of Sciences, Engineering, and Medicine [NASEM], 2018; Perkins, 2014; Wineburg, 2001). Teachers, then, should simultaneously scaffold and facilitate students during the learning process towards specific and achievable goals (Wells, 2002). One way this notion of teachers as guides manifests in the classroom is by and through the use of problem- and project-based learning. English and Kitsantas (2013) argue true understanding in students stems from teachers engaging students in the active participation within the learning process, rather than viewing students as passive consumers and recipients of knowledge. Similarly aligned with Saye and Associates (2015) notion of authentic pedagogy, "effective teachers use the key ideas of their disciplines as guides to create deep learning experiences that immerse students in using knowledge in meaningful ways" (p. 65).

"Teaching is more than imparting knowledge; it is inspiring change. Learning is more than absorbing facts, it is acquiring understanding" (William Arthur Ward (1921-1994)). Just as a locomotive necessitates both a conductor and an engine, true understanding requires both intentional strategies from the teacher and purposeful, visible outcomes from students. In other words, students must also take ownership of the learning process (Wells, 2002) and practice metacognition, as individuals learn more effectively if they understand how they learn and how to monitor their own learning (Darling-Hammond et al., 2008; Goldman & Pellegrino, 2015). Blythe (1998) describes a "performance of understanding" as a tangible way for students to showcase their learning and for teachers to assess this learning. Teachers who consistently incorporate performances of understanding into their pedagogical scheme provide students with opportunities to retrieve and use this knowledge (Perkins, 2014). It also important to note, useful knowledge is not limited to the confines of the classroom. Useful knowledge is both internalized but then externalized across various contexts (Darling-Hammond et al., 2008). This paper will discuss elements that can cultivate understanding for students in various disciplines.

Frameworks

While there are many facets that contribute to teaching for understanding, this paper will focus on three: types of knowledge, task selection, and classroom environment, as these were common themes among the included frameworks. These three aspects will be discussed in the context of different content areas through potential frameworks. Similarities were found between the frameworks for different disciplines focusing on types of knowledge, task selection, or classroom environment.

Types of Knowledge

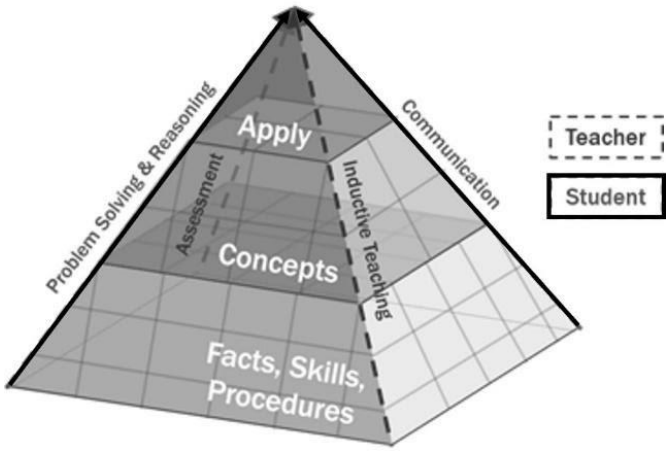
When considering how to teach for understanding, teachers should recognize the types of knowledge students need to gain deeper levels of understanding. Teachers may challenge the conventional methods of teaching when they aim for these deeper levels for their students. There is a difference between students understanding facts versus concepts. To illustrate, this idea is explained in the context of mathematics and social studies potential frameworks for teaching for understanding in the sections that follow.

Mathematics

Factual and conceptual knowledge are essential to a student's mathematical understanding. While both types of knowledge are important, it is the marriage of the two that leads to a deep understanding of mathematics (Wathall, 2016). Figure 1 is a framework that represents an approach for how teachers can foster a deep understanding of mathematics for students as described by National Council of Teachers of Mathematics [NCTM] (2018). Both students and teachers play an important role in achieving this level of understanding. Students can extend their knowledge and understanding by communicating their ideas and improving their problem solving and reasoning skills. Teachers can support students by using inductive teaching methods to provide opportunities to strengthen their knowledge of facts, skills, and procedures, as well as deepen their understanding of mathematical concepts through applications.

Figure 1

Teaching for Understanding Framework in a Mathematics Classroom



The different levels of the pyramid shown in Figure 1 are not taught separately in mathematics, but rather interwoven throughout instruction. NCTM (2014) suggests the idea of procedural fluency being built from a foundation of conceptual understanding as an effective mathematics teaching practice. The blocks in each level of the pyramid represent the different pieces that build this foundation of understanding. If blocks are missing in the lower levels, the pyramid does not have a strong foundation on which to stand. The pyramid is separated into procedures, concepts, and applications. In order to appropriately use their mathematical knowledge, students need to know how, why, and when to use it; only teaching memorization or rote procedures is inadequate in achieving this goal (Goldman & Pellegrino, 2015). In this framework, procedures are knowing *how*, concepts are knowing *why*, and applications are knowing *when* to use the mathematics. By gaining both factual and conceptual knowledge, students can solve problems by thinking about mathematics in different ways and transferring their knowledge to new situations (NCTM, 2014; National Mathematics Advisory Panel, 2008; National Research Council [NRC], 2001).

Factual knowledge consists of the facts, skills, and procedures students possess. These are important for students to know, but learning cannot stop here. This is the lowest level of the pyramid because it often requires low-level thinking skills. This type of knowledge is ultimately the ability to execute rote procedures to solve problems (Rittle-Johnson & Star, 2007). Factual knowledge includes memorization, which does not guarantee a conceptual understanding (NRC,

2001; Wathall, 2016). A student may be able to use an algorithm or follow a procedure but may not understand the meaning behind it. Although this level does not show a deep understanding, it is essential to achieving a deep understanding of mathematics. Wathall (2016) noted students need to know the facts and procedures to reinforce their understanding of concepts. When teaching for understanding, teachers need to ensure they are not relying on deductive teaching methods. Instead, teachers should have students demonstrate their understanding, rather than just practicing routine skills. To be proficient in mathematics, students need to have procedural fluency as well as a conceptual understanding (NCTM, 2014; NRC, 2001; Wathall, 2016). Students should have opportunities to think beyond basic facts and procedures. This leads to the importance of conceptual knowledge.

The second level represents conceptual knowledge that deepens understanding of mathematics. As previously mentioned, this level does not necessarily come after the procedures are taught; it is important that students have the opportunity to build both levels. Wathall (2016) described concepts as "mental constructs, which are timeless, universal, and transferable across time or situations" (p. 6). Conceptual knowledge is more flexible and generalizable than procedural knowledge because it is not tied to a specific type of problem (Rittle-Johnson & Star, 2007). Concepts allow students to see the context of the facts and procedures and make connections between the topics. Without making connections between mathematical concepts, students rely on memorization and view the different facts and procedures in isolation (Levav-Waynberg & Leikin, 2012). Concepts are in the middle of the pyramid because they are the connection between procedures and application. To gain a deep mathematical understanding, students cannot skip this level. Banks and Barlex (2014) stated the knowing *why* should be matched to the needs to knowing *how* in order to create usable knowledge. When teachers use concept-based lessons, they are able to create a path between the factual knowledge and a conceptual understanding for their students. Students need to understand the meaning behind the mathematics they are learning, so it can become usable knowledge. When students understand the concepts of mathematics, they can work towards the top level of the pyramid by transferring their knowledge to new situations (NCTM, 2014).

By allowing students to gain both factual and conceptual knowledge, they can build their foundation to reach the top level of application. As Wathall (2016) stated, "Conceptual understanding is not just an accumulation of knowledge; it is an ability to transfer and apply knowledge to new, unfamiliar, situations" (p. 160). This level suggests how students can use their factual and conceptual knowledge of mathematics. Students should be given opportunities to apply their mathematical knowledge to deepen their understanding. Perkins (2014) described this as the shift from thinking *about* to thinking *with* a topic. Through real-world, authentic tasks, students have the opportunity to apply their factual knowledge and demonstrate their conceptual understanding. They need to understand how to do the mathematics, why the mathematics works, and when to apply the different concepts and procedures. Helping students gain a combination of factual and conceptual knowledge is an important component of teaching for understanding in the mathematics classroom as it helps students make connections between mathematical ideas, encourages problem solving by transferring knowledge to new situations, and ultimately builds a strong foundation of mathematical understanding.

Social Studies

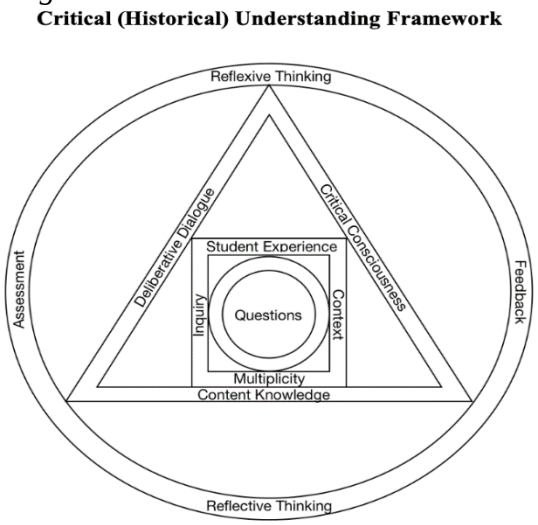
For much of its existence, the social studies has been characterized by the instruction and memorization of an official knowledge of facts, dates, and ideas (Grant & Gradwell, 2010;

VanSledright, 2011; Wineburg, 2001), causing students to view the subject as information-heavy, boring, and irrelevant. Despite educators' attempts to utilize various strategies to encourage the accurate retention and recall of historical information, student performance on high-stakes tests and interest in the subject area continues to decrease. Thus, a framework for understanding in the social studies should challenge this conventional, collective memory approach that depicts learners as passive consumers of information via textbooks, teachers, and other forms of official knowledge (Grant & Gradwell, 2010; Misco, 2014; VanSledright, 2011; Wineburg, 2001).

The Critical (Historical) Understanding Framework (Figure 2) contains four distinct, yet complementary tiers. The first tier (inner circle), or the core of the framework, consists of questions. Questions lay the foundation for deep learning from which teachers create subsequent problems, learning goals, instructional strategies, and quality assessments. One's ideal pedagogical scheme comprises the second tier (square) of the framework and includes inquiry, multiplicity (incorporating diverse perspective), context, and student experience throughout instruction. These elements undergird one's instructional praxis, affirm students' funds of knowledge and cultural wealth (Moll & Gonzalez, 2004; Yosso, 2005), and cultivate in students a healthy intellectual skepticism (VanSledright, 2011). Student illuminations, or the observable understandings of students, make up the third tier (triangle) of the framework. Visible student outcomes of content knowledge, deliberative dialogue, and a critical consciousness extend on Rogers' (1969) belief that effective education should produce "fully-functioning individuals" (Merriam & Bierema, 2014, p. 54) by emancipating students from passively consuming official knowledge and equipping them with the "capacity for cultural and political criticism ('reading the world')" (Burbules, 1993, p. 6). Lastly, the fourth and final tier (outer circle) of the framework encompasses the previous three and could be summarized as the creation of a dialogical learning environment. A balancing act must exist between the use of assessment and the opportunity for feedback, as well as the practices of reflective and reflexive thinking.

Figure 2

Critical (Historical) Understanding Framework



Not only does the Critical (Historical) Understanding Framework challenge the conventional teaching and learning within the social studies, the framework, most notably,

attends to four types of knowledge: factual knowledge, procedural knowledge, conceptual knowledge, and metaknowledge. While factual knowledge is considered the information or details related to a given subject area, procedural knowledge forms the integration of these pieces and leads to one's action. Further, conceptual knowledge is the characterization and eventual categorization of greater bodies of information, whereas metaknowledge refers to the reflective and reflexive action of an individual (Solhaug, 2006). A problematic characteristic of the traditional teaching and learning within the social studies rests in the instructional saturation of factual and procedural knowledge. As the integration of all four types of knowledge contributes to higher order thinking and learning, a truly effective framework fuses the various classifications of knowledge.

For example, content knowledge, according to Goldman & Pellegrino (2015), is the effective organization of facts which gives individuals the ability to recall and apply specific pieces of information. Deep learning, therefore, results from acquiring a base of factual knowledge, understanding the context of these facts and ideas, and then effectively applying this knowledge (Goldman & Pellegrino, 2015; Perkins, 2014). Another crucial element of the Critical (Historical) Understanding framework, deliberative dialogue, engages students with contradicting perspectives, both historically and scholarly, and encourages students to assess evidence before coming to conclusions (McAvoy & Hess, 2013). Similar to Blythe's (1998) performances of understanding, dialogue makes student learning visible (Goldman & Pellegrino, 2015), cultivates student participation, and fosters critical thinking (Wineburg, 2001). In direct consequence of the acquisition of a foundation of content knowledge and the intentional, consistent practice of deliberative dialogue (procedural knowledge), the Critical (Historical) Understanding framework cultivates in students Freire's (1970) of critical consciousness. This concept of historical agency (Seixas & Peck, 2004) does not produce students who are "swept into" history, but rather develops students into active learners who first confront, analyze, and question official narratives and then become "conscious" to cultural hegemony, relationships of power, and the marginalization of ideas and groups of people (Blevins & Talbert, 2015). Lastly, critical reflective and reflexive thinking encapsulate the periphery of the framework. Reflective thinking encourages participation, cultivates self-regulated learning and meta-cognition, increases motivation, and pushes students towards overcoming difficult tasks (Fook, 2007; Gao, 2013; NASEM, 2018). Reflexive thinking, on the other hand, "means examining and unsettling our assumptions, actions and their impact" (Cunliffe, 2009). Practiced in both teachers and students, reflexive thinking is a contributing factor in the process of one's becoming as a human being (Freire, 1970) and affords opportunities for individuals to evaluate and transform biases, misplaced values, and oppressive beliefs (Bolton, 2014; Christie et al., 2015).

Similarities Between Frameworks

While social studies and mathematics instruction may look different in the classroom, there are similarities between the different types of knowledge students should possess. Both frameworks challenge the conventional teaching methods of the disciplines by not having factual knowledge as the sole focus of instruction, but rather extending beyond this basic level of knowledge. While there is a need for this factual knowledge in both disciplines, there is also a need for a broader conceptual knowledge. For mathematics, students need to have procedural fluency as well as a conceptual understanding to be proficient in mathematics (NRC, 2001). Similarly for social studies instruction, integrating the different types of knowledge leads to higher order thinking and learning for students. When teaching for understanding, there should

be an emphasis on weaving these types of knowledge together to build that foundation of understanding for students.

For both mathematics and social studies, there is a need to move beyond the memorization of facts. Students should be encouraged to make connections to deepen their understanding. A way to move beyond memorization is to find ways to apply the learning to students' lives. In mathematics, this means including real world, authentic tasks that allows students to transfer their knowledge to new situations. In social studies, this means having students understand the role they play in history and cultivating a critical consciousness. While this practice of applying the learning to students' lives may look different between the two disciplines, it is an important piece to include when considering how to teach for understanding in mathematics and social studies.

Task Selection

In addition to considering various types of knowledge, to effectively teach for understanding, teachers should also consider the tasks they select for their classroom. This includes activities, assignments, and assessments. While task selection is important for all teachers to consider, it can look different between content areas. Through the careful selection of tasks, teachers can help students gain an understanding of the content, as well as demonstrate their understanding. In the following sections, the aspect of task selection will be discussed in the context of foreign language classrooms and culturally responsive mathematics classrooms reflected as potential frameworks for teaching for understanding.

Foreign Language

Within the foreign language classroom, task selection is critical to student language acquisition and overall understanding. Although many factors play a role in how students learn a foreign language, it is task selection that permeates each aspect of the language acquisition process that leads students to deep understandings (Salaberry & Lafford, 2006). Moreover, this deep understanding in the foreign language classroom is achieved when the task selection is comprised of building on or enhancing previous student experiences (Kilbane & Milman, 2014). Not only does meaningful task selection in the foreign language classroom help students develop target language skills, but more importantly they deepen their understanding of the foreign language through authentic applications.

Presently, a variety of languages exist that are just waiting to be discovered and learned. Thanks to foreign language instructors and their classrooms, students gain exposure to and learn world languages. However, this occurs only if the teachers are equipped to provide this exposure. In order to accomplish the task of students learning a foreign language, and for teachers to guide the individuals in their classroom to understanding, foreign language educators must consider communication, motivation, classroom environment, assessment, cultural competency, and task selection. Figure 3 represents a framework for considering these tenants in foreign language instruction. In sum, the foreign language classroom must promote acceptance and positivity so that students can meaningfully communicate, be persistent and persevere in their learning, recognize distinctive cultural viewpoints in the target language, and be able to demonstrate their understanding through ongoing and cumulative assessments.

Figure 3

The World of Foreign Language Teaching for Understanding Framework

Although the aforementioned tenets of a foreign language classroom that values understanding are synergistic, task selection fuses each component together. Across all content areas, educational settings, and student populations, task selection is the manner by which information is presented, assessments are conducted, and learning is established. Without the teacher's meticulous incorporation of task selection into the curriculum, learners can be hindered from ample levels of understanding. When planning tasks for learners, it is critical to be mindful of the rationale behind each selection. The root of purposeful task selection traces back to constructivism, a philosophical viewpoint established by Jean Piaget (Matthews, 2003). In constructivism, which Piaget coins as a worldview, learners are seen as constructors who acquire new knowledge by building on what they can already comprehend (Piaget, 1952). In other words, learners' past experiences contribute to their current knowledge acquisition. What Piaget presents in constructivism directly correlates to how educators should select tasks for their students, regardless of the discipline taught.

The first way that educators can make their classroom tasks meaningful for students is by connecting the information to what students already know. A learner is not a "tabula rasa," or a "blank slate" (Goldman & Pellegrino, 2015; Piaget, 1952; Salaberry & Lafford, 2006). Every student in a learning environment brings in their own lived experiences and cultural factors- their backgrounds are imperative to learning. Not only should learning be related to student backgrounds, but it should also apply to the real world. This can be accomplished by integrating formal, academic learning with informal, experiential learning that permeates learner's personal lives (Zapata & Lacorte, 2018). Classrooms aligned with this framework use relevant, personalized materials that connect to the diverse backgrounds of students, such as their world, culture, and community. Moreover, it is important for students to reference their knowledge to ideas they already know and make learning relevant to student lives, both of which are essential for understanding as a whole (Kilbane & Milman, 2014; NASEM, 2018). When educators purposefully select tasks that allow for "relating new information to existing knowledge as [the students] learn" it results in "deep learning and long-term memory of the information" (NASEM, 2018, p. 119).

In terms of purposeful task selection for educators of foreign language learners, regardless of whether they are a non-native or a heritage speaker, task selection should expand beyond the classroom setting in order to give students experiential, relevant learning

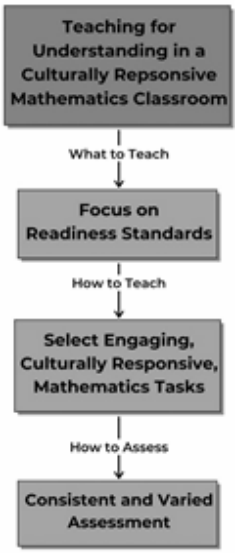
opportunities. In order for students to reach understanding across all aspects of foreign language acquisition, a key to success is taking learning ‘outside’ of the traditional classroom so students begin connecting learning opportunities to lived experiences the students have had, or even connecting the target language to other disciplines. As a whole, curricular and pedagogical resources need to be related to learners’ personal, social, and cultural backgrounds (Salaberry & Lafford, 2006). Furthermore, foreign language classrooms must integrate “formal/academic learning and informal/personal learning as a way to reflect the new realities that all learners experience in their everyday lives” (Zapata & Lacorte, 2018, p. 228). By being cognizant of the influence of real-life connections and applications of knowledge, students will be led to curiosity, inquiry, intrinsic motivation, expansion to other ideas, and thorough understanding.

Culturally Responsive Mathematics

Similar to establishing any learning environment, one must consider what to teach students, how to teach students and how to assess student understanding. However, to develop a culturally responsive classroom, the learning environment must also validate each student’s cultural identity, recognize and problematize social injustices, and encourage productive collaboration between cultures (Abdulrahim & Orosco, 2019; Ladson-Billings, 1995). As teachers construct each component of the learning environment, they should strive to incorporate these ideas seamlessly into routine. There should be an emphasis on depth over breadth of content (Allsopp et al., 2007). Instructional activities should be engaging that allow students to explore and discover the big ideas, develop vocabulary through mathematical discourse, and make connections to student's everyday life and the real world. Students should consistently be assessed in a variety of ways to allow students to express their understanding in multiple ways. Figure 4 represents a framework where teachers can transition through the three components and offer opportunities for teachers to achieve a culturally responsive mathematics classroom (CRMC).

Figure 4

Teaching for Understanding in a Culturally Responsive Mathematics Classroom



To create a culturally responsive mathematics classroom that supports teaching for understanding, tasks should allow students opportunities to explore and discover the big ideas in the content instead of solely taught through direct instruction (Kersaint et al., 2009). When building mathematical understanding, students should be at the forefront of the activities selected. Students should be active participants and have opportunities to discover concepts on their own. As students begin to develop these sense-making skills on a more frequent basis, they begin to see themselves as mathematicians; they grow in confidence and begin to establish themselves as the primary mathematical authority in the classroom. Three factors should be considered when selecting mathematical tasks: ensure students can participate in discourse about the mathematics topic, allow for students to be the mathematical authority, and support students to actively make connections within the content, to other disciplines, to their everyday life and the real world.

Utilize Classroom Discourse. Tina Blythe (1998) suggests that the instructional tasks selected should be those in which students are "performing their understanding" that "help students build and demonstrate their understanding…in observable ways". Collaboration is an essential part of achieving a CRMC. Students need to learn how to communicate with each other across cultural divides respectfully and productively (Abdulrahim & Orosco, 2019). Classroom discourse is a critical activity in all mathematics classrooms as learning is more meaningful when students are active participants in the lesson (Allsopp et al., 2007). Not only is the ability to collaborate with peers a twenty-first-century skill that will benefit them in the long run, but it will also maintain the balance of student voice and teacher in the classroom. Each and every student should be given a chance to talk out their ideas and "discover" what the lesson aimed to teach. Utilizing productive classroom discourse is also a way for teachers to pose problems with social injustices or world issues in the context of mathematics (Abdulrahim & Orosco, 2019). Students can not only learn about and discuss possible solutions for large scale problems, but they can also see that mathematics goes beyond the word problems they read in textbooks or on state assessments. In NCTM's publication, *Catalyzing Change in Middle School Mathematics* (2020), one of the recommendations made is to understand that one of the purposes of mathematics is to help students understand and critique our world. When teachers select "tasks that honor the uniqueness of [students] as individuals while also allowing them to experience mathematics in personal and socially meaningful ways [teachers] empower students to maximize the utility of mathematics in a variety of ways to understand and critique the world" (NCTM, 2020).

Maintaining the Mathematical Authority. Part of being culturally responsive is to allow each and every student to establish their own mathematical identity within the classroom. To develop one's mathematical identity, one must be able to see themselves in the mathematics but also see themselves as a mathematical authority (NCTM, 2020). The goal is for the students to view themselves as a mathematician and not have an overdependence on resources such as the teacher or the calculator (McCulloch et al., 2013). Teachers should practice self-reflection to unveil the tasks they are selecting allow all students to be mathematical authorities or only students from particular cultures (Abdulrahim & Orosco, 2019). When students can take ownership of their own learning, the mathematics will become more meaningful.

Focus on Connections. If students are not taught to identify connections when learning mathematics, it will be challenging for them to apply what they know to situations in and outside of the classroom. When considering the big ideas of mathematics, Allsopp and colleagues (2007) proposed teachers should think about the units or topics in a content area as individual trees

which when observed as whole create a forest of knowledge. Teachers should look at both the trees and the forest when teaching mathematics as well as explicitly making connections between the “trees” and the “forest” so students can begin to develop an “adult view of mathematics” (pp. 32–33). When students start to look for patterns and connections in their own lives, they begin to see themselves in the mathematics. Teachers must incorporate these curricular mirrors to encourage students towards the development of their mathematical identity (Abdulrahim & Orosco, 2019). Selecting tasks that helps students make connections is an important part of any mathematics classroom, but especially for ones trying to achieve cultural responsiveness.

Similarities Between Frameworks

When considering task selection as an aspect of teaching for understanding in foreign language and culturally responsive mathematics classrooms, there is an emphasis on choosing tasks that make connections to the real world. The learning becomes relevant for students when they are able to see how it connects to their lives outside the classroom. Both frameworks highlight the importance of bringing students’ culture into the classroom to support student learning. For foreign language, the tasks should be personalized to connect students’ diverse backgrounds, as well as their lived experiences. Similarly, tasks in culturally relevant mathematics classrooms should help students understand and critique the world around them. Task selection is an important aspect of teaching for understanding, as it can lead to rich, meaningful experiences in the classroom for students.

Classroom Environment

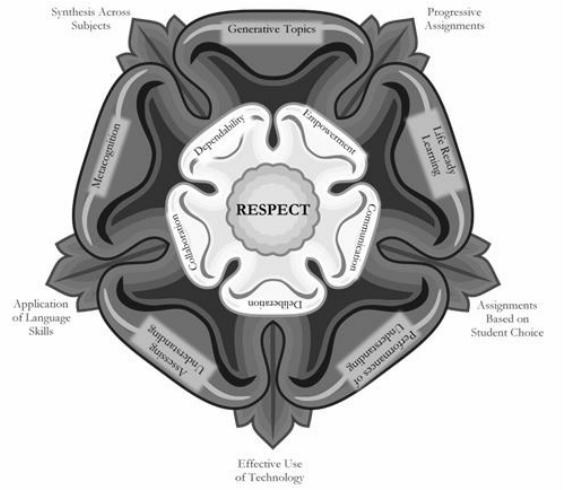
The classroom environment plays an important role in teaching for understanding. Encouraging practices such as communication and collaboration in the classroom can lead to meaningful interactions that can foster a deeper understanding of the content for students. Although aspects of classroom environment can look similar between content areas, there may still be differences based on the teachers’ focus. The aspect of classroom environment in potential frameworks for English Language Arts and Literacy are discussed in the following sections to illustrate how it can relate to teaching for understanding for each discipline.

English Language Arts

Teaching for understanding is critical in the English Language Arts classroom because students will need to apply the knowledge and skills gained in the English classroom every day of their lives. Whether they are encountering advertisements, communicating to employers, colleagues, or family members, or expressing their thoughts and opinions, they are using English Language Arts Skills. The framework shown in Figure 5 uses mutual respect as the foundation of the classroom. The concepts of collaboration, deliberation, dependability, life-ready learning, and assignments offering student choice stem from this foundation of respect. When an English Language Arts classroom features these concepts, students gain a better understanding of content and skills and are uniquely empowered to employ the English language in their lives.

Figure 5

A Framework for Teaching for Understanding in the English Language Arts Classroom



Collaboration and deliberation provide students with authentic opportunities to apply their English language skills. The English language is best learned when it is used properly and because collaboration is identified as a "21st century skill" (NASEM, 2018, pp. 17–18; cf. Rader, 2002) working together needs to be the cornerstone of an English classroom. Any collaboration must be founded upon respect. Students need to be led to recognize that their collaborators each have dignity as well as unique ideas and skills. Furthermore, students feeling valued and respected in the classroom directly correlates with an increase in self-worth, achievement, and participation (Cameron et al., 2005; NASEM, 2018). Collaboration can involve a range of group activities from peer editing, group presentations, group research projects, and even more basic activities like turn-and-talks or think-pair-shares. Undergirding each of these activities is the need for authentic dialogue and meaningful interaction with the English language.

Deliberation, in both individual and group settings, is a necessity in modern English classrooms. In the modern world, the number of information sources has so vastly increased that students need to be able to consider carefully which sources have merit and which do not. Students must also be able to glean from the sources the information needed to form opinions and generate arguments. Finally, they should learn how to present these arguments to their peers, weighing them against alternative viewpoints in order to determine an opinion, a solution, or a decision. In deliberating their findings with others both the person presenting and those offering their own opinions need to be mindful of the dignity of their peers, not seeking to belittle or undercut their classmates. If students can learn how to communicate, collaborate, and deliberate well in schools, imagine how political discourse, family life, and our society could improve (Gutmann, 1999).

Dependability is twofold: students must be able to depend upon their teacher and upon each other. Esquith (2007) links trust and dependability together. For millennia, humanity has existed in interdependent societies, and classrooms are miniature versions of these where interdependency is still necessary (Rogoff, 2015; Tomasello, 2001). Students must be able to depend on their teacher for classroom stability, fair treatment, and a quality education.

Furthermore, students need to be able to depend on one another, for in common society or the workplace they will have to depend on other people and have other people depending on them. Rowan Williams (2016) articulates this idea succinctly when he writes, “We are all dependent on each other… [this] vision is dynamic – everyone is engaged in building up everyone else’s human life and dignity” (p. 69). Thus, dependability in the classroom is grounded upon respect.

A broadening consensus is forming within education circles that learning must prepare students for life outside of the classroom. Perkins (2014) called this idea “life-ready learning.” Learning must engage insight, action, and ethics in order to prepare students for the multifaceted challenges of twenty-first century life. In the English classroom in particular, life-ready learning involves equipping students with critical reading skills and a reliable command of the English language. Perkins (2014) emphasized that life-ready learning must be applicable. As such, while students might benefit from memorizing which books the Brontë sisters wrote or the difference between a compound and a complex sentence, it is far more important for them to be able to apply their English language skills to everyday responsibilities. Teachers must facilitate practices conducive to life-ready learning. Students will also better engage with and learn from activities which they find pertinent to their own lives.

Having assignments based in student choice does not mean that students can choose whether or not they do their work, rather it means giving students freedom to make their work personal. Jeffery and Wilcox (2014) studied students and found that the best writers were those who were able to write about topics that had personal meaning. In the English classroom, there are many opportunities to assign projects that have personal meaning for students. In the study of literature, teachers can assign students a topic or theme related to their subject of interest and have students trace that topic through a literary work. In this case, students have the opportunity to further understand their own subject of interest by following how a particular author dealt with it.

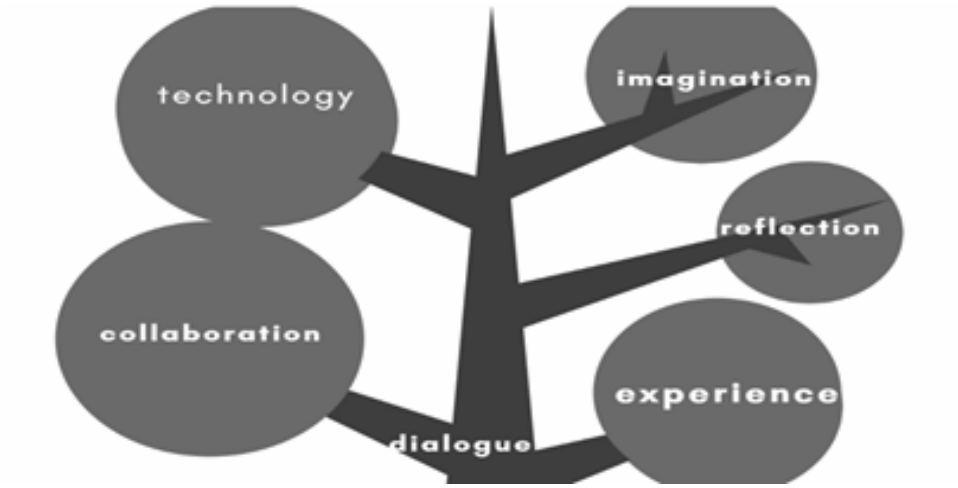
Teachers, recognizing their students as the goal of their instructional efforts, have a duty to empower their students with skills and valuable understanding for life beyond the classroom. In the English classes in particular, this duty means teaching students how to digest literature and information, construct their own ideas and opinions based on data, and aptly articulate their thoughts, needs, and arguments. Students can also empower each other. When they are involved in teaching one another or working together they become active users of knowledge rather than passive recipients of knowledge (Freire, 1970) and gain a certain sense of empowerment based in ownership of the material (Bereiter & Scardamalia, 1993). Students need not only to feel a sense of empowerment, but also know both that they have a command of course materials and that they can implement these materials in their own lives to their own purposes. This empowerment is a core part of teaching for understanding. Upon it, effective collaboration and deliberation, life-ready learning, and assignments based on student choice can be built.

English as a Second Language

In the conventional ESL classrooms, learning is misunderstood as the accrual of linguistic skills and teaching is simplified as linear delivery of textbook knowledge and decontextualized practice of linguistic skills. To disrupt the conventional schooled literacy, a conceptual framework was designed with the purpose of establishing a dialogical learning environment in literacy classrooms through collaborative activities, shown in Figure 6. In this environment, big understandings (Perkins, 2014) are made possible when space and

opportunities are created for students to make their voices and develop their identities as active agents in a reciprocal relationship between community members.

Figure 6
Developing Big Understandings in the Literacy Classroom



To maximize the efficiency of learning, autonomous skills are deposited by teachers in students' minds, and students passively accept without questioning. Freire (1970) called this type of education the banking model. According to Freire, the way to abolish the hierarchical banking model is through dialogue. Dialogue is more than the conversation between individuals; it is a social character of knowing and learning. During this process, individuals share their thoughts and experiences, reflect on and express what they have learned from each other, and then take actions. By doing so, their minds and hearts are changed, and transformation is expected to be achieved in the dialogic process. Dialogue also serves as a vehicle that facilitates the shift from the instructor-centered banking model to the student-centered collaborative model. In the dialogic learning environment, the hierarchical structure of teaching and learning in literacy classrooms is disrupted, and a reciprocal relationship between community members, teachers and students alike, can be built. Freire (1970) suggested, "Through dialogue, the teacher-of-the students and students-of-the teacher cease to exist, and a new term emerges: teacher-student with students-teachers" (p. 80).

When referring to effective learning, many scholars believe horizontal learning has been sacrificed for vertical learning in schools (Campano, 2007; Gee, 2017). To achieve the lifeworthy learning, hegemony and homogeneity of vertical learning should be overthrown, and a network structure should be built, allowing learners to interact with and depend on each other, drawing on the wisdom of each individual, making collaborative efforts to find the solution to lifeworthy problems (Perkins, 2014). In this network structure, new affinity spaces are created. Community learners share not only their lived experience or knowledge, but also responsibility for resourcing, teaching, and mentoring. Diversity becomes a driving force of collective intelligence in a dialogical exploration. Overall, this conceptual framework posits a dialogic learning environment for students. Through dialogue and collaboration in the classroom, students not only become active participants in knowledge construction, but more importantly, they

develop their own agency and autonomy as well as collective intelligence in various relationships.

Similarities Between Frameworks

These frameworks discussed elements of the classroom environment that can lead to teaching for understanding for English and ESL. A classroom environment that encourages collaboration was highlighted as an important aspect to include for both disciplines. Collaboration allows for respect to be built between students and the teacher, as well as provides the opportunity for meaningful interaction in which students can learn from their peers. By including collaboration, dialogue is encouraged in the classroom. In the framework for English Language Arts, dialogue can be fostered through students working together on tasks, as well as in presenting and critiquing arguments. A foundation of respect in the classroom can lead to students effectively communicating with their peers and the teacher. For the ESL framework, a classroom environment that emphasizes dialogue can shift the instruction from teacher-centered to student-centered. Students become active participants in their learning as they are sharing their ideas and learning from others. A common theme between these frameworks is that there is more to teaching for understanding than just how to present the content to students. The classroom environment can foster aspects of communication and collaboration that lead to a deeper understanding for students.

Conclusion

In this paper, we offer ways for teachers to both consider and apply the generalizable tenets of teaching for understanding within the specific disciplines of mathematics, social studies, foreign language, English, and ESL. Although there are various facets of teaching for understanding, our proposed frameworks focus on three fundamental elements: types of knowledge, task selection, and classroom environment. In both mathematics and social studies, it is important for teachers to acknowledge and cultivate the necessary foundation of content/factual knowledge, while also encouraging higher levels of thinking by using strategies to promote conceptual, procedural, and metaknowledge. Task selection within the disciplines of mathematics and foreign language should serve to connect to students' backgrounds, culture, and experiences. By using culturally relevant tasks, students gain a deeper meaning and understanding of the content and the world around them. Lastly, classroom environments that encourage collaboration, dialogue, and respect are important for the disciplines of English and ESL. By giving students the opportunity to communicate their ideas and learn from others, teachers can foster problem-posing, collaborative classrooms where students and teachers simultaneously participate in the co-creation of meaning.

Importantly, while these frameworks provide a snapshot into successful strategies for cultivating understanding within specific disciplines, there are a number of elements/ideas threaded through each of the frameworks that transcend subject areas and foster understanding in students regardless of the classroom/discipline. As Blythe (1998) argues, understanding is the ability to think and act flexibly with what one knows. Additionally, understanding builds on knowledge, emphasizing the construction of meaning. Teachers should desire and then implement ways for students to remember what information means and why it is important, so meaning-making occurs when they encounter to-be-remembered material (NASEM, 2018). Ultimately, understanding is a dialogical process, consisting of intentional acts by teachers and purposeful, visible outcomes by students.

References

Abdulrahim, N. A., & Orosco, M. J. (2019). Culturally responsive mathematics teaching: A research synthesis. *The Urban Review*. https://doi.org/10.1007/s11256-019-00509-2

Allsopp, D. H., Kyger, M. M., & Lovin, L. H. (2007). *Teaching mathematics meaningfully: Solutions for reaching struggling learners*. Paul H. Brookes.

Banks, F., & Barlex, D. (2014). *Teaching STEM in the secondary school: Helping teachers meet the challenge*. Routledge.

Bereiter, C., & Scardamalia, M. (1993). *Surpassing ourselves: An inquiry into the nature and implications of expertise*. Open Court Publishing Company.

Blevins, B., & Talbert, T. (2015). Challenging neoliberal perspectives: A framework for humanizing social studies teacher education. In A. R. Crowe & A. Cuenca (Eds.), *Rethinking social studies teacher education in the twenty-first century*. Springer.

Blythe, T. (1998). *The teaching for understanding guide*. Josey-Bass.

Bolton, G. E. (2014). *Reflective practice: Writing and professional development* (4th ed.). SAGE Publications.

Burbules, N. (1993). *Dialogue in teaching: Theory and practice*. Teachers College Press.

Cameron, J., Pierce, W. D., Banko, K. M., & Gear, A. (2005). Achievement-based rewards and intrinsic motivation: A test of cognitive mediators. *Journal of Educational Psychology*, *97*(4), 641–655. https://doi.org/10.1037/0022-0663.97.4.641

Campano, G. (2007). *Immigrant students and literacy: Reading, writing, and remembering* (Practitioner Inquiry Series). Teachers College Press.

Christie, M., Carey, M., Robertson, A., & Grainger, P. (2015). Putting transformative learning theory into practice. *Australian Journal of Adult Learning, 55*(1), 9–30.

Cunliffe, A. L. (2009). The philosopher leader: On relationalism, ethics and reflexivity—a critical perspective to teaching leadership. *Management Learning, 40*(1), 87–101. https://doi.org/10.1177/1350507608099315

Darling-Hammond, L., Barron, B., Pearson, P. D., Schoenfeld, A. H., Stage, E. K., Zimmerman, T. D., ... & Tilson, J. L. (2008). *Powerful learning: What we know about teaching for understanding*. John Wiley & Sons.

Dewey, J. (1910). *How we think*. D. C. Henry & Co. Publishers.

English, M. C., & Kitsantas, A. (2013). Supporting student self-regulated learning in problem- and project-based learning. *Interdisciplinary Journal of Problem-Based Learning, 7*(2), 127–150. https://doi.org/10.7771/1541-5015.1339

Esquith, R. (2007). *Teach like your hair's on fire: The methods and madness inside room 56*. Penguin.

Fook, J. (2007). Reflective practice and critical reflection. In J. Lishman & J. Kingsley (Eds.), *Handbook for practice learning in social work and social care: Knowledge and theory* (2nd ed., pp. 363–375). Jessica Kingsley.

Freire, P. (1970). *Pedagogy of the oppressed*. Continuum.

Gao, X. (2013). Reflexive and reflective thinking: A crucial link between agency and autonomy. *Innovation in Language Learning & Teaching, 7*(3), 226–237. https://doi.org/10.1080/17501229.2013.836204

Gee, J. P. (2017). *Teaching, learning, literacy in our high-risk high-tech world: A framework for becoming human*. Teachers College Press.

Goldman, S. R., & Pellegrino, J. W. (2015). Research on learning and instruction: Implications for curriculum, instruction, and assessment. *Policy Insights from the Behavioral and Brain Sciences, 2*(1), 33–41.

Grant, S. G., & Gradwell, J. M. (Eds.). (2010). *Teaching history with big ideas: Cases of ambitious teachers*. Rowman & Littlefield Education.

Gutmann, A. (1999). *Democratic education* (Rev. ed.). Princeton University Press.

Jeffery, J., & Wilcox, K. (2014). "How do I do it if I don't like writing?": Adolescents' stances toward writing across disciplines. *Reading & Writing*, *27*(6), 1095–1117. https://doi.org/10.1007/s11145-013-9493-9

Kersaint, G., Thompson, D. R., & Petkova, M. (2009). *Teaching mathematics to English Language Learners*. Routledge.

Kilbane, C. R., & Milman, N. B. (2014). *Teaching models: Designing instruction for 21st century learners*. Pearson.

Ladson-Billings, G. (1995). Towards a theory of culturally relevant pedagogy. *American Educational Research Journal*, *32*(3), 465–491.

Levav-Waynberg, A., & Leikin, R. (2012). The role of multiple solution tasks in developing knowledge and creativity in geometry. *The Journal of Mathematical Behavior*, *31*(1), 73–90.

Matthews, W. J. (2003). Constructivism in the classroom: Epistemology, history, and empirical evidence. *Teacher Education Quarterly*, *30*(3), 51–64.

McAvoy, P., & Hess, D. (2013). Classroom deliberation in an era of political polarization. *Curriculum Inquiry*, *43*(1), 14–47. https://doi.org/10.1111/curi.12000

McCulloch, A. W., Kenney, R. H., & Keene, K. A. (2013). What to trust: Reconciling mathematical work done by hand with conflicting graphing calculator solutions. *School Science & Mathematics*, *113*(4), 201–210. https://doi.org/10.1111/ssm.12016

Merriam, S. B., & Bierema, L. L. (2014). *Adult learning: Linking theory and practice*. Jossey-Bass.

Misco, T. (2014). Powerful social studies unit design: A companion to powerful social studies teaching and learning. *Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *87*(6), 241–248. http://dx.doi.org/10.1080/00098655.2014.938598

Moll, L. C., & Gonzalez, N. (2004). Engaging life: A funds of knowledge approach to multicultural education. In J. A. Banks & C. A. M. Banks (Eds.), *Handbook of research on multicultural education* (2nd ed., pp. 699–715). John Wiley & Sons, Inc.

National Academies of Sciences, Engineering, and Medicine. (2018). *How people learn II: Learners, contexts, and cultures*. The National Academic Press.

National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all.* Author.

National Council of Teachers of Mathematics. (2018). *Catalyzing change in high school mathematics: Initiating critical conversations*. Author.

National Council of Teachers of Mathematics. (2020). *Catalyzing change in middle school mathematics: Initiating critical conversations*. Author.

National Mathematics Advisory Panel. (2008). *Foundations for success: The final report of the National Mathematics Advisory Panel*. US Department of Education.

National Research Council. (2001). *Adding it up: Helping children learn mathematics.* The National Academies Press. https://doi.org/10.17226/9822.

Perkins, D. (2014). *Future wise: Educating our children for a changing world.* Jossey-Bass.

Piaget, J. (1952). *The origins of intelligence in children*. International University Press.

Rader, H. B. (2002). 21st century literacy summit. *Library Hi Tech News*, *19*(7). https://doi.org/10.1108/lhtn.2002.23919gac.002

Rittle-Johnson, B., & Star, J.R. (2007). Does comparing solution methods facilitate conceptual and procedural knowledge? An experimental study on learning to solve equations. *Journal of Educational Psychology*, *99*(3), 561–574.

Rogers, C. (1969). *Freedom to learn*. Merrill.

Rogoff, B. (2015). Human teaching and learning involve cultural communities, not just individuals. *The Behavioral and Brain Sciences*, *38*, e60. https://doi.org/10.1017/S0140525X14000818

Salaberry, R., & Lafford, B. A. (2006). *The art of teaching Spanish: Second language acquisition from research to praxis*. Georgetown University Press.

Saye, J., & Associates. (2015). Achieving authentic pedagogy: Plan units, not lessons. In W. C. Parker (Ed.), *Social studies today: Research and practice* (pp. 65–72). Routledge.

Seixas, P., & Peck, C. (2004). Teaching historical thinking. In A. Sears & I. Wright (Eds.), *Challenges and prospects for Canadian social studies* (pp. 109–117). Pacific Educational Press.

Solhaug, T. (2006). Knowledge and self-efficacy as predictors of political participation and civic attitudes: With relevance for educational practice. *Policy Futures in Education*, *4*(3), 265–278. https://doi.org/10.2304/pfie.2006.4.3.265

Tomasello, M. (2001). *The Cultural Origins of Human Cognition* (Reprint edition). Harvard University Press.

VanSledright, B. A. (2011). *The challenge of rethinking history education: On practices, theories, and policy*. Routledge.

Wathall, J. T. (2016). *Concept-based mathematics: Teaching for deep understanding in secondary classrooms*. Corwin Press.

Wells, G. (2002). Learning and teaching for understanding: The key role of collaborative knowledge building. *Advances in Research on Teaching*, *9*, 1-41. https://doi.org/10.1016/S1479-3687(02)80004-9

Williams, R. (2016). *Being disciples*. Wm. B. Eerdmans Publishing.

Wineburg, S. (2001). *Historical thinking and other unnatural acts: Charting the future of teaching the past*. Temple University Press.

Yosso, T.J. (2005). What culture has capital? *Race, Ethnicity, and Education*, *8*(1), 69-91.

Zapata, G. C., & Lacorte, M. (2018). *Multiliteracies pedagogy and language learning: Teaching Spanish to heritage speakers*. Springer International Publishing.

Literacy and the Impacts of Collaboration

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Abstract

For school leaders to accomplish substantial improvement in student achievement over the next several years, they need to know what works and what does not. They need to gather information about each child that helps educators target instruction appropriately. They need to place appropriate and accurate data in the hands of those who can help improve the learning of all children and who have the skills and commitment to improve schools based on facts. Experienced administrators know that new programs alone rarely secure and sustain academic improvement. Schools are highly complex systems, and successful educational leaders recognize that all of the key components and processes in the school system must be aligned toward improvement in order to achieve the desired results. Using a mathematical analogy, Stephens (1999) contended that (a) a system leader who believes in quality improvement processes and its tools, (b) plus a facilitator who is knowledgeable in quality improvement tools and processes, (c) plus sustained commitment to demonstrate the value of the organization's programs and services equals continuing development of an organization and sustained improvement.

Introduction

The ability to read and comprehend text is a crucial skill required for the academic achievement and life success of our students in a globally connected and information-driven society (Connor, Morrison, Fishman, Giuliani, Underwood, & Schatschneider, 2011). Significant research conducted by Carson, Gillon, & Bouslead, (2013) reported an alarming percentage of more than 70% of students reach fourth grade unable to read and comprehend text at or above proficient levels, and this rate is higher for students who attend high poverty schools.

The international prevalence statistics provided by the National Assessment of Educational Progress (NAEP) suggest that up to one in three children struggle with the acquisition of basic reading and writing skills (Carson et al., 2013). One way to ensure reading achievement occurs is to ensure the key predictors of early literacy success are taught effectively and efficiently in the classroom curriculum.

Carson et al., (2013) stated that phonological awareness is a predictor for early reading success. The study was completed through a quasi-experimental design employed to measure phonological awareness, reading, and spelling development of 125 five-year old children. Thirty-four children received 10 weeks of phonetical awareness instruction from their teachers. Ninety-five children continued with their usual reading program, which included phonics instruction but did not target phonological awareness.

The results of the study indicated children who received phonological awareness instruction demonstrated superior literacy outcomes compared to children who followed the usual literacy curriculum (Carson et al., 2013). Children with speech-language impairments showed significant improvements in phonological awareness, reading, and spelling but had a different pattern of response to instruction compared to children with typical language. In conclusion, teaching children to become efficient readers in their classrooms is paramount to their future academic learning and lifelong success.

Literature Review

Sailors and Price (2010) indicated that while reading achievement of fourth and eighth graders has continued to rise, the gap in performance scores between all ethnicities: white, Asian/ Pacific Islander, African American, Hispanic, and Native American peers continues to grow.

The Carnegie Corporation of New York's Council on Advancing Adolescent Literacy revealed that as many as half of secondary school students could not read all but the most basic texts (King, Lemons, & Hill, 2012). Foster and Miller (2007), suggest that high school achievement outcomes could be accurately predicted by performance scores as early as second grade for many students. The purpose of their study was to specify the developmental trajectories for phonics and early text comprehension of children from kindergarten through third grade.

Foster and Miller (2007) administered the Early Childhood Longitudinal Study, developed under the sponsorship of the U.S. Department of Education, National Center for Education Statistics. A total of 12,621 students were included in this analysis. The students included kindergarten through third grade. It is not known if the researchers accounted for the differences in participant numbers in each grade. Of the total number of students selected to be in the study during the base year, this 12,621 represented an 83% participating rate over four years.

Participants were divided into three school readiness groups based on the assessment of literacy skill development at the time of entrance into kindergarten. The groups were tracked on phonics and text comprehension development through the third grade. Results indicated students in the average and high literacy readiness groups achieved high scores in decoding (phonics) by the end of the first grade. The students in the low readiness group did not match these scores until the third grade. Although the phonics gap was mostly closed in the third grade, a second very significant comprehension gap was exposed. This study supported the idea that there is an overlap in the developmental stages of literacy.

Sailors and Price (2010), stated it is imperative that all children become proficient in their ability to read and are provided opportunities to engage in higher-level thinking. The researchers completed a study in Texas by testing two models of professional development for classroom teachers as a way of improving their practices and increasing the reading achievement of their students. The study was composed of 44 participating teachers, grades second through eighth, from three school districts. These teachers learned to teach their students cognitive reading strategies. The participants included teachers from the second grade (n=6), third (n=3), fourth (n=6), fifth (n=5), sixth (n=3), seventh (n=11), and eight (n=8) grades. These teachers represented a variety of subjects. One group attended a traditional two-day summer in-service and the second group attended a workshop and received classroom-based support from a reading coach. Random-effects, multilevel pretest-posttest comparison group designs, and multilevel modeling analytic strategies were used to determine the effects of the two models.

The results of the study suggested that students in classrooms in which teachers offered more opportunities to engage in comprehension strategies were associated with positive changes in their reading achievement scores. The study found that teachers should not only provide students with the opportunity to engage in cognitive reading strategies but also construct explanations around those strategies with the students. The more chances the teachers offered to their students, the more the students seemed to engage in constructed explanations around those strategies.

Spracher (2000) reported that spoken and written language have a reciprocal relationship, such that each build on the other to result in general language competence, starting early and continuing through childhood into adulthood. Children with spoken language problems frequently have difficulty learning to read and write.

In a study completed by Wilson, McNeill and Gillon (2015) the researchers sought to examine the knowledge and perceptions of student teachers and student SLPs (Speech Language Pathologists) in the areas of language concepts, literacy curriculum, service delivery, and professional collaboration. This study was completed through an online survey of 58 student primary school teachers and 37 student SLPs in their final year of professional study.

The results of this study indicated that these groups possessed a limited understanding of each other's expertise in literacy curriculum and spoken language concepts. Participants demonstrated acceptance of indirect methods of classroom-based service delivery but were less accepting of direct methods of classroom-based service delivery. The teachers and SLPs reported minimal experience with collaboration during their pre-service education. The results of this study indicated the need for pre-service inter-professional education with a focus on children's early literacy learning to prepare SLPs and teachers for collaborative instruction that enhance children's communication.

Impacts of Collaboration

Mass, Hacker, & Weincek, (2004) noted that, at the beginning of the school year, one of the priorities of classroom teachers is to create a trusting and accepting classroom environment. Quality tools such as consensograms, ground rules, affinity diagrams, brainstorming, plus and delta, force-field analysis, and the PDSA (Plan, Do, Study, Act) cycle are used to solve an identified problem. Mass et al. (2004) found, “These strategies assisted students in understanding what was expected of them. As a result, they met classroom goals and became more productive learners. The authors further suggested, “Teachers and staff should continue to ask for student stakeholder input and feedback concerning their learning. Teachers, students, and staff should reflect on this feedback and make necessary adjustments to instruction and the classroom environment.”

When a visitor stepped into a classroom at Laurel Mountain Elementary School (2005), he or she saw students creating mission statements or classroom rules and procedures, establishing personal learning goals, recording personal learning data, and analyzing results from a unit of study. The visitor heard students participating as they were evaluating and discussing their learning. Students knew why they were involved in a particular unit of study. The visitor saw students actively participating in learning in whole group, small groups, and individually. This learning was exciting for the students and teachers because, according to the Laurel Mountain Elementary School report, they were working together to build high-performing classrooms based on a commitment to increase student achievement.

There have been many studies that discuss the importance of collaboration. One study by Glover, McCormack, & Smith-Tamaray, (2015) investigated the needs of teachers and SLPs and their preferences for service delivery when working with primary school-aged children. This method used a mixed-methods research design. There were two phases to this study. In Phase One, all teachers (Schools n = 16) and SLPs (n = 36) were invited to complete a questionnaire. The responses were obtained from 14 teachers and six SLPs.

In the second phase, a subsample of participants (n = 4) contributed to a focus group. Teachers and SLPs expressed a desire for increased training and more collaborative practice. The teachers and SLPs voiced frustration at perceived systemic inadequacies concerning funding, personnel, and resources. The results of this study suggested that a change to service delivery needs to be considered at an individual, interpersonal, and organizational level. Changes to the service delivery model will produce better outcomes for children with speech and

language disorders and increase support from their families and the professionals that work with them.

Foster and Miller (2007) noted that clinicians feel they are reaching many potentially disabled or low literacy readiness students through complete classroom instruction. This approach was believed to be important because SLPs often question their role in supporting students who have not formally qualified for speech or language services but who might still exhibit weaknesses in speech/language, emergent literacy, or early phonetics development. As a form of inclusion, SLPs in the classroom worked to cluster their students and provide the instruction to the entire class. Wilson, McNeill, & Gillon (2016) observed the political and philosophical shifts toward a more integrated and inclusive form of education. They noted that there is an increased emphasis on creating classroom instruction to meet the diverse learning needs of all students.

Brandel and Loeb (2011) completed a study through an online survey with almost 2,000 SLPs responding. The purpose of the study examined the student, SLP, and workplace characteristics that may influence the SLPs' recommendations. The SLPs reported that current students on their caseload with severe to moderate disabilities participated in interventions two to three times per week for 20-30 minutes in groups outside of the classroom. The students with the least severe disability received intervention one time a week for 20-30 minutes in groups outside of the classroom. The SLP worked with the teacher to develop classroom techniques, implement the standards, and assist with differentiated instruction for students who were at different proficiency levels across the standards. Therefore, as collaboration is integral to supporting the child's communication, social, emotional, and academic development, SLPs must work with teachers, other professionals, and parents to meet the learners' needs (Wium & Louw, 2013).

Providing resources and support is vital as children learn differently. Therefore, teachers need to utilize a variety of strategies to adapt lessons and efficiently plan to cater to all students' learning abilities. The cognitive strategies implemented in the classroom are designed to promote independent student thinking.

The first step of providing services in the classroom involves building a collaborative working relationship between two professionals (Vicker, 2013). The benefits of collaboration include: (a) consistency of approach, (b) transfer, and (c) sharing of knowledge and skills among professionals (Glover et al., 2015). Consultation is one method SLPs may initially use in working with a teacher or a team within a classroom focus.

The collaborative role opens the doors for a more intensive, on-going involvement with the education of the students (Vicker, 2013). The team can focus on improving communication support in many curricular areas for all students: (a) at the core level of instruction, (b) targeting skills for a select group of students, or (c) focusing on students with specific challenges. In all three areas, the students could benefit from the experience and skills of an SLP. Collaboration is a two-way process that requires teachers and SLPs to discuss specific learners, learning objectives, and how these can be achieved as well as sharing knowledge and expertise in the planning and assessment of learners (Wium & Louw, 2013).

Conclusion

Schools should be organized, data-driven, problem-solving systems where all personnel take part in the teaching/learning process (Obiakor, Harris, Mutua, Rotatori, & Algozzine, 2012). There is no better time than now to help school administrators understand the foundational

underpinnings of language and literacy and the knowledge SLPs can bring through intervention and collaboration (Blosser, Roth, Paul, Ehren, Nelson, & Strum, 2012). Collaboration with SLPs improves students' ability to access the curriculum and contributes to communication, language arts, and literacy. The SLP must play multiple roles in the intervention and curricular programs which impact individual students, whole classes, and instructional staff (Vicker, 2013). Also, it is essential to note collaboration is not merely two or more people working together, but more importantly it is how two or more people can effectively work towards a shared goal (Leader-Janssen, Swain, Delkamiller, & Ritzman, 2012).

References

Blosser, J., Roth, F.P., Paul, D.R., Ehren, B.J., Nelson, N.W., & Strum, J.M. (2012). Integrating the core. *ASHA Leader*, *17*(10), 12-15.

Brandel, J.M., & Loeb, D.F. (2011). Program intensity and service deliver models in the schools: SLP survey results. *Language, Speech, and Hearing Services in Schools*, *42*, 461-490. doi:10.1044/0161-1461(2011/10-0019

Carson, K. L., Gillon, G. T., & Boustead, T. M. (2013). Classroom phonological awareness instruction and literacy outcomes in the first year of school. *Language, Speech & Hearing Services in Schools (Online), 44*(2), 147-160. https://libcatalog.atu.edu:443/login?url=https://libcatalog.atu.edu:2409/docview/1420387073?accountid=8364

Connor, C. M., Morrison, F. J., Fishman, B., Giuliani, S., Luck, M., Underwood, P. S., & Schatschneider, C. (2011). Testing the impact of child characteristics x instruction interactions on third graders' reading comprehension by differentiating literacy instruction. *Reading Research Quarterly*, *46*(3), 189-221. https://libcatalog.atu.edu:443/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=64368062&site=ehost-live&scope=site

Foster, W. A. & Miller, M. (2007). Development of the literacy achievement gap: A longitudinal study of kindergarten through third grade. *Language, Speech, and Hearing Services in Schools*, *38*(3), 173.

Glover, A., McCormack, J., & Smith-Tamaray, M. (2015). Collaboration between teachers and speech and language therapists: Services for primary school children with speech, language and communication needs. *Child Language Teaching and Therapy*, *31*(3), 363-382.

King, S. A., Lemons, C. J., & Hill, D. R. (2012). Response to intervention in secondary schools: Considerations for administrators. National Association of Secondary School Principals. *NASSP Bulletin*, *96*(1), 5-22. https://libcatalog.atu.edu:443/login?url=https://libcatalog.atu.edu:2409/docview/1009166105?accountid=8364

Laurel Mountain Elementary School. (2005). *Baldrige quality process.* Author. http://209.184.141.5/laurelmountain/ Baldrige.htm

Leader-Janssen, E., Swain, K.D., Delkamiller, J., & Ritzman, M.J. (2012). Collaborative relationships for general education teachers working with students with disabilities. *Journal of Instructional Psychology*, *39*(2), 112 -118. https://libcatalog.atu.edu:443/login?url=https://libcatalog.atu.edu: 2409/docview/1316655478?accountid=8364

Mass, Y., Hacker, J., & Weincek, B. (2004). *Professional learning communities: Beall goes Baldrige*. Beall Elementary School. http://www.mcps.k12.md.us/schools/bealles/baldrige/BeallBaldrige .htm

Obiakor, F.E., Harris, M., Mutua, K., Rotatori, A., & Algozzine, B. (2012). Making inclusion work in general education classrooms. *Education & Treatment of Children*, 35(3), 477-490. https://libcatalog.edu:443/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=a2h&AN=76972741&site=ehost-live&scope=site

Sailors, M. & Price, L.R. (2010). Professional development that supports the teaching of cognitive reading strategy instructions. *The Elementary School Journal, 110*(3), 301-322.

Spracher, M.A. (2000). Learning about literacy: SLPs play key role in reading, writing. The *ASHA Leader*, *5*, 1 – 19. http://leader.pubs.asha.org/article.aspx?articleid=2292588

Stephens, G. (1999). *The Baldrige Quality Assessment: A service to districts and a tool for service agency improvement.* Association of Educational Service Agencies. http://www.aesa.us/Pubs/ 99perspect/balridge_quality_assess.html

Vicker, B. (2013). The 21st century speech language pathologist and integrated services in classrooms. *The Reporter, 14*(2), 1-5, 17.

Wilson, L., McNeill, B.C., & Gillon, G. T. (2015). The knowledge and perceptions of prospective teachers and speech language therapists in collaborative language and literacy instruction. *Child Language Teaching and Therapy*, *31*(3), 347-362. doi:2097/10.1177/0265659015585374

Wilson, L., McNeill, B.C., & Gillon, G.T. (2016). A comparison of inter-professional education programs in preparing prospective teachers and speech and language pathologists for collaborative language-literacy instruction. *Read Write*, *29*, 1179-1201.doi: 10.1007/s11145-016-9631-2

Wium, A.M. & Louw, B. (2013). Revisiting the roles and responsibilities of speech-language therapists in South African schools. *The South African Journal of Communication Disorders*, *60*(1), 31-37. doi: http://libcatalog.atu.edu:2097/10.4102/sajcd.v60i1.8

Perceptions of Teaching Writing with the use of Technology Before, During and After Covid-19

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Abstract

Secondary English/Language Arts teachers must teach their students to analyze literature and informational text, write for a variety of purposes, listen to information, present their own work, and use language effectively. Unfortunately, in a cursory poll, teachers have reported that they leave their education preparation programs without knowing how to adequately teach their students to write. In addition, teachers do not feel confident when incorporating technology into their instruction, often believing that technology is not necessary when teaching writing in particular (Morgan and Chenowith, 2017). The purpose of this study was to examine the change or lack of change in teacher perceptions with regard to using technology when teaching writing to public school students before, during, and following the Covid-19 pandemic. Data were collected from 35 participants using a survey format. Participants were current secondary English teachers in the United States across 17 states.
Keywords: writing instruction, technology, secondary education

Introduction

Writing instruction for secondary students is a complex task. Sedita (2019) proposes that writing, like the strands of a rope, has multiple strands: critical thinking, syntax, text structure, writing craft, and transcription. Educators must explicitly teach students how to generate ideas, navigate the writing process, identify different writing purposes, incorporate literary devices, choose words for clarity and elaboration, transition from one idea to the next, and use correct grammar. In a cursory canvas conducted on the social media platform Facebook, 77% of the teachers polled (149 teachers answered) indicated that they did not feel they were prepared in college to teach writing. This expressed lack of preparation to teach writing combined with Morgan and Chenowith's (2017) reported lack of preparation to use technology during instruction creates cause for concern with our current students. Add in a pandemic that forces teachers and students to use technology for instruction and the concern increases.

To better understand how Covid has impacted teachers' use of technology in writing instruction, data were collected from 35 participants using a survey format. Participants were current secondary English teachers in the United States.

The study sought to answer the following main research questions:

1. What technology was used prior to Covid for the instruction of writing and student production of writing?
2. What technology was used during Covid for the instruction of writing and the student production of writing?
3. What technology might be used after the "return to normal"?
4. Have teachers' perceptions of technology changed due to the demand of more virtual instruction as a result of Covid?

Review of Literature

Teachers and technology have had a tumultuous relationship over the past several decades. The tumult has largely been due to teachers' perceptions of the usefulness of

technology and their preparedness to use technology in a way that supports the teaching of content. A 1999 study conducted by the U.S. Department of Education (2000) reported that only one-third of teachers felt well-prepared or very well-prepared to use technology and the Internet in the classroom. Almost two decades later, teachers concede that there is value in the use of technology for instructional purposes, but they still struggle with understanding how to use it effectively (Gallup, Inc, 2019). Even though teachers concede that there is value in the use of technology for instructional purposes, teachers are resistant to the use of technology to teach writing, stating that technology is important in general but not essential for writing instruction (Morgan & Chenowith, 2017). This is concerning since the mobile generation, or 21st century learners, make up the entirety of our student population and with this comes the need for 21st century learning skills.

21st century learning skills consist of students' cognitive, metacognitive, sociocultural, productivity, and technological understandings which speak to learning skills, literacy skills, and life skills (Koh, et al., 2015). “Current literature in the learning sciences promotes the benefits of integrating ICT [information communication technology] into lesson design to help students develop twenty-first-century competencies” (Koh, et al., 2015, p. 537). Teachers can foster the development of these skills by creating avenues for students to write in multiple modalities. Multimodality refers to the use of different modes for communication: written, oral, non-verbal, and visual. Multimodal writing uses multiple modes in composition (Palmeri, 2012). These modalities should include opportunities for students to manipulate audio, images, and video, adding multiple layers of complexity and composition to their texts (Morgan & Chenowith, 2017). Tasks such as creating blogs, vlogs, podcasts, infographics, and explainer videos could be incorporated into instruction to allow students other means of producing writing and to help them develop 21st century skills. These activities provide relevance and real-world writing connections for students in our increasingly technological world.

Even though there is a need for students to employ multiple modalities while learning to be proficient writers, researchers have found that pre-service and in-service teachers do not feel prepared to use technology in this way nor do they understand the benefits for multimodality writing (Morgan & Chenowith, 2017). Many preservice teachers actually “resist the idea that writing is changing” (Hundley & Holbrook, 2013, p. 500). Edwards-Groves (2012) posits that teachers view technology as a separate entity apart from content instruction and contends that a pedagogical shift must happen to bridge the gap.

Outside of school, students are often content creators, using social media to communicate and innovate. “More than one-half of American teens could be considered media creators” (Jenkins et al, 2006, p. 6). Students “make blogs and web pages; distribute self-authored artwork, narratives, and videos online; and remind existing content into mash-ups for online distribution” (Hundley & Holbrook, 2013, p. 501). It is important that teachers, in turn, harness that natural drive in their writing curriculum (Edwards-Groves, 2012).

Unfortunately, teachers forgo technology instruction for a variety of reasons which include: 1. Lack of professional development 2. Lack of time and 3. Lack of technical support and resources. Hundley and Holbrook (2013) suggest that, in particular, English Language Arts teachers need support and training in how to use multimodal platforms to teach students composition. Hutchinson and Reinking (2011) reported that the biggest obstacle to teachers using technology in their instruction was the lack of time to integrate technology in the allotted class period, lack of time to plan effective instruction using technology, and lack of time to learn

how to use the technology themselves. Carver (2016) discovered that technology availability is a major concern for educators' usage, more so than any other factor.

All of the resistance and hindrances aside, at the end of the 2019-2020 school year and into the 2020-2021 school year, many teachers were forced to use technology in ways they never had before. The Covid pandemic thrust students, teachers, and school districts into unfamiliar territory--navigating instruction six-feet apart. Even in the brick-and-mortar setting, technology usage became the new normal. School districts had to provide access to computers, bulk up infrastructure, and employ more platforms for communication, learning management, and instructional practice whether they wanted to or not. Barron, Cobo, Munoz-Najar, and Sanchez Ciarrusta (2021) state that pedagogy and time management changed dramatically across the globe due to the pandemic. These changes have forced teachers to use new technology and existing technology in new ways to meet the needs of students.

Design

Secondary English Language Arts teachers were invited to complete a Google Forms survey. Participants were contacted at random through various ELA-focused Facebook groups with a request to complete the survey. When members replied positively, they were sent more information about the survey, a consent form, and a link to the survey. Teachers from 17 states responded to the survey. Grades 6-12 were represented, with 21 participants teaching multiple grade levels at a time.

The survey was anonymous and consisted of 19 questions (4 closed-response and 15 open-response) (see Appendix A). The first four questions requested demographic and framing information (grade level, state, standards, and assessment). The study sought to answer the following main research questions:

1. What technology was used prior to Covid for the instruction of writing and student production of writing?
2. What technology was used during Covid for the instruction of writing and the student production of writing?
3. What technology might be used after the "return to normal"?
4. Have teachers' perceptions of technology changed due to the demand of more virtual instruction as a result of Covid?

The demographic information provided rich description about the writing instruction expectations and assessment measures for writing proficiency. Once data were collected, the open response answers were analyzed using open coding methodologies to identify themes. The types of technologies used for instruction and the production of writing were tabulated and cross referenced based on pre-Covid, during-Covid, and estimated post-Covid use. All closed response questions were analyzed using percentages and frequency counts.

Results

Overview

The open response questions asked participants if they used technology pre Covid and during Covid as well as their expected use after Covid for teaching writing and for the student production of writing. Sixty-nine percent of teachers reported they used technology for writing instruction prior to Covid and 77% stated that they used technology for student production of writing prior to Covid. Fifty-one percent of teachers reported using technology during Covid for writing instruction and 46% of teachers stated that they used technology for student production

of writing during Covid. Seventy-four percent of teachers revealed that they plan to use technology for writing instruction post Covid and 71% of teachers claim they will use technology for student production of writing post Covid.

Twenty-eight percent of teachers reported they did not use technology for writing instruction prior to Covid and 23% stated that they did not use technology for student production of writing prior to Covid. Twenty-three percent of teachers reported that they did not use technology during Covid for writing instruction and 31% of teachers stated that they did not use technology for student production of writing during Covid. Three percent of teachers revealed that they do not plan to use technology for writing instruction post Covid and 6% of teachers claim they will not use technology for student production of writing post Covid.

Table 1
Use of Technology

	Teachers used technology to teach writing	Students used technology to produce writing
Pre-Covid Yes	24	27
Pre-Covid No	10	8
Pre-Covid Somewhat	1	0
During Covid Yes	18	16
During Covid No	8	11
During Covid Somewhat	9	8
Post Covid Yes	26	25
Post Covid No	1	2
Post Covid Somewhat	8	8

Note: There were 35 participants

Openness to Technology

When asked about their openness to explore, experiment, and use new technology as a result of Covid, 66% of teachers indicated that they felt more open, 20% stated they were not more open, and 14% reported they may be more open.

When asked if their perception of using technology to teach writing has changed, 14% of teachers reported that it has while 69% claimed that it has not. Twenty-three percent of teachers expressed that their perception about students using technology for the production of writing has changed while 60% revealed that it has not.

Table 2

Perception change

	Yes	No	Maybe
Has your perception changed about the use of technology to teach writing?	5 14%	24 69%	6 17%
Has your perception changed about students using technology for the production of writing?	8 23%	21 60%	6 17%

Technology Used

Teachers were asked to list the technology used pre-Covid, during Covid, and what they expect to use post Covid (see table below). Most frequently, typing technology like Google Docs or Word was cited for use in both instruction and student production of writing. Learning Management systems like Canvas, Schoology, and Google Classroom increased during Covid along with lesson video-recording and virtual meeting spaces. Post-Covid, most teachers would like to keep the typing technology and Learning Management Systems, but plan to streamline their use.

Table 3

Technology Used

Pre-Covid Technology for Instruction	Pre-Covid Technology for Student Writing Production	During Covid technology for Instruction	During Covid technology for Student Writing Production	Post Covid technology for Instruction	Post Covid technology for Student Writing Production
Google Docs Google Classroom Flocabulary.com Brainpop PowerPoint Prezi YouTube videos Edpuzzle Google Slides Paper Rater	Google Docs Google Classroom No Red Ink Turnitin.com Digital Graphic organizers Commonlit Google Slides	YouTube Videos Discussion boards Video conferencing (WebEx, Zoom) PowerPoint LMS (Schoology, Canvas) Pre-recorded lessons Loom Meet Nearpod Nitro Type	Google Docs GoSoapBox Google Classroom Turnitin.com Meet Word Canva Paint Essay Pop	YouTube Videos Google Docs GoSoapBox Edpuzzle Writeco apps Google Slides Grammarly Paper Rater	Online discussion platforms Google Docs Google Classroom Turnitin.com Flipgrid IXL Google Slides

Grammarly Smartboard Document Camera No Red Ink Internet resources IXL LMS (Schoology) Khan Academy Commonlit Essay Pop Quill Actively Learn Newsela Infohio Google Forms Teams Kahoot Quizizz Online textbook Purdue Writing Lab Annotate.net Google Meet Turnitin.com Shmoop Flipgrid One Note	Publisher Word Essay Pop Podcasts Infohio Graphic design Teams Canva Videos	Flipgrid Canva No Red Ink Jamboard Kami Google Docs Quill Screencastify Google Slides Grammarly Paper Rater IXL Essay Pop Newsela Commonlit Actively Learn Infohio Google Classroom Digital feedback/commentary Purdue Owl One Note	Google Slides Teams Screencastify Quizizz Grammarly Paper Rater Publisher Paint	Google Classroom No Red Ink Flipgrid IXL LMS (Schoology, Canvas) Khan Academy Essay Pop Newsela Commonlit Actively Learn Infohio Smartboard Doc camera Google Forms Teams Kahoot Quizizz PowerPoint Kami Quill Screencastify Annotate.net Paint Shmoop	Paint Essay Pop LMS No Red Ink Podcasts Digital graphic organizers Grammarly Jamboard PowerPoint Teams Screencastify Digital portfolios Meet Commonlit Publisher Paint

Reasons for Technology Used

Not all respondents elaborated on their reasons for keeping certain technology or which technology they would keep. For those who did elaborate, when asked why they would keep technology, respondents indicated that Learning Management Systems helped them to stay organized; typing technology made student work more legible and provided an easier avenue for sharing work during peer editing and teacher commentary. Teachers also liked the idea of being paperless to reduce waste and time spent copying material.

When asked why they would not use current technology, teachers believed that the technology was overwhelming as there are so many options with repetitive functions, technology did not allow students to learn from their mistakes since spell check and grammar check fixed errors, and some demographics made it difficult to access technology. Several teachers indicated that their school did not have enough devices for each student, therefore students had to use their personal cell phones in face-to-face classes.

Most teachers described using technology for typing and electronically submitting work. Only two teachers used technology for creating student products other than text-driven writing: podcasts and videos.

Of those who stated that their perceptions haven't changed, 63% were already using technology. All of the teachers who revealed that their openness hasn't changed stated they were already using technology and had always been open.

Table 4

Elaboration

Concerns about the use of technology	Believes Benefits of using technology	Why perception hasn't changed	Why openness hasn't changed	Actual use of technology
Too reliant (5) Limited access (3) Not tech savvy Overwhelming (2) Time to teach tech (2) Time for troubleshooting Believes students should handwrite (5) Easier to plagiarize	Paperless (4) Tool for neatness Sharing with peers Revision is easier Immediate feedback (3)	Already used technology (15) Technology is just a supplement (2)	Already used technology (7)	Digital Submissions (4) Typing (11) Supplement (3) Digitized writing process (25) LMS

Discussion

Teachers' Use

According to the data, teachers' use of technology for the instruction of writing decreased from 69% prior to Covid to 51% during Covid. The use of technology for student writing production also decreased from 77% prior to Covid to 46% during Covid. Teachers did not provide a reason for this decrease. Further investigation would be required to explain this decrease. It should be noted, though, that 74% of the teachers participating in this study believe they will continue to use technology for instruction post Covid and 71% believe they will use technology for student production of writing post Covid. The majority of teachers intend to use technology for typing and submission of student work.

Perception of Use

When exploring the types of technology used and the purposes for its use, 94% of the teachers surveyed use technology as a digitized writing process and the collection of student work, believing that they are "using a lot of technology" (anonymous participant). Only two participants used technology in more innovative ways: students creating podcasts and videos. It is unclear if this is due to teachers having a narrow view of what constitutes writing or a narrow

view of what constitutes technology. There are many other technologies that can support student writing production: blogs, vlogs, explainer videos, radio dramas, infographics, automated presentations, wikis, storyboards. If teachers are tasked with preparing students to be consumers and producers of media, as the literacy skills for 21st century learners demand, then solely typing text-based writing in a Google Doc will not prepare them for multifaceted communication. The data also suggest that technology is often used as a supplement to writing instruction primarily aimed at helping students improve their grammar with websites such as Grammarly, No Red Ink and Quill, instead of being integrated into instruction.

Future Research

If teachers have a narrow view of writing and technology, more research needs to be conducted to determine why that is. The Common Core standards for English Language Arts (or variations of these standards) are used by forty-one states across the United States (Common Core State Standards Initiative, 2013). Of the 17 states represented in this study, 15 use Common Core Standards or a variation. The Common Core Standards are divided into reading and analysis of informational text and literary text; foundational reading; writing; speaking and listening; and language. Writing includes writing argumentative, informative and narrative texts; producing and distributing writing; researching; and writing routinely. The standards on producing and distributing writing (which are the closest standards to using technology for instruction and production) require students to write clearly and coherently, to work through the writing process, and to use technology to produce and publish writing. There is no specification about the types of writing products that can be created through technology. In addition, of those surveyed, all participants described an essay-based standards-based writing assessment that requires students to write a response to an expository or argumentative prompt. With the added pressure of testing, teachers may focus on teaching explicitly the type of writing that is tested instead of branching out to more creative and innovative writing tasks.

Looking at the connection between the states using Common Core standards, standards-based writing assessments, and the lack of innovative use of technology, one must question if the lack of integrated technology use for writing is due to strict adherence to the standards, which do not specify various types of technological writing products? Do standardized tests dictate writing instruction? Do curriculum mapping and pacing guides, which prescribe how and when educators teach writing, impact the narrow views of writing and technology? Does the push for reading remediation influence teachers' decisions about writing instruction? More research should be conducted to explain why teachers are using technology mostly as means for digitizing the writing process and for producing text-only writing products.

Conclusion

The purpose of this study was to examine the change or lack of change in teacher perceptions with regard to using technology when teaching writing to public school students before, during, and following the Covid-19 pandemic. The results reveal that the majority of teachers in this study have not changed their perceptions about using technology for the instruction of writing or student production of writing. Covid did create a need for video conferencing, digital submission of work, and teacher-recorded lessons. Most teachers surveyed plan to continue to use technology post Covid, again, for digitizing the writing process and submitting work.

21st Century Learning Skills necessitate students' critical thinking, citizenship, communication, creativity, collaboration, and growth mindset. These skills should be better reflected in the standards that English Language Arts teachers use. In addition, teacher education programs need to create courses that not only prepare pre-service teachers to teach writing but to do so in ways that embrace technology as a means for writing production. Technology should not be relegated to supplementation but should be a focus for creation. Pre-service teachers need to view student writing as more than essays or text-driven compositions, but as a multidimensional skill that can combine visual and auditory components with reader interaction.

References

Barron, M., Cobo, C, Munoz-Najar, A., & Sanchez Ciarrusta, I. (2021). The changing role of teachers and technologies midst the COVID 19 pandemic: Key findings from a cross-country study. *Educational for Global Development.*

Carver, L. B. (2016). Teacher perception of barriers and benefits in K-12 technology usage. *The Turkish Online Journal of Educational Technology, 15*(1), 110-116.

Common Core State Standards Initiative (2013). Closing the expectations gap 2013: Annual report on the alignment of state K-12 policies and practice with the demands of college and careers. http://www.corestandards.org/standards-in-your-state/

Education technology use in schools (2019). Gallup, Inc. http://www.newschools.org/wp-content/uploads/2019/09/Gallup-Ed-Tech-Use-in-Schools-2.pdf

Edwards-Groves, C. (2012). Interactive creative technologies: Changing learning practices and pedagogies in the writing classroom. *Australian Journal of Language and Literacy, 35*(1), 99-113.

Hundley, M., & Holbrook, T. (2013). Set in stone or set in motion? Multimodal and digital writing with preservice English teachers. *Journal of Adolescent and Adult Literacy, 56*(6), 500-509.

Hutchinson, A., & Reinking, D. (2011). Teachers' perceptions of integrating information and communication technologies into literacy instruction: A national survey in the United States. *Reading Research Quarterly, 46*(4), 312-333.

Jenkins, H., Clinton, K., Purushotma, R., Robinson, A. J., & Weigel, M. (2006). Confronting the challenges of participatory culture: Media education for the 21st century. *Occasional Paper, Massachusetts Institute of Technology,* The MacArthur Foundation.

Koh, J. H. L., Chai, C. S., Benjamin, W., & Hong, H. (2015). Technological pedagogical content knowledge (TPACK) and design thinking: A framework to support ICT lesson design for 21st century learning. *Asia-Pacific Educational Research, 24*(3), 535-543. doi:10.1007/s40299-015-0237-2

Morgan, D. N., & Chenowith, N. H. (2017). "This I Believe" about the teaching of writing: Secondary teachers' digital essays about their pedagogical understandings. *Reading Horizons, 56*(3), 52-66.

Palmeri, J. (2012). *Remixing Composition: A History of Multimodal Writing Pedagogy.* Conference on College Composition and Communication of the National Council of Teachers of English.

Sedita, J. (2019). The strands that are woven into skilled writing. *Keys to Literacy.* www.keystoliteracy.com

U.S. Department of Education, National Center for Education Statistics. (2000). Teachers' tools for the 21st century. A report on teachers' use of technology. Washington, DC.

Appendix A
Survey Questions

1. What grade do you teach?
2. In which state do you teach?
3. What ELA standards does your state use?
4. Describe your standardized/standards-based writing test.
5. Typically, what technology do you use to teach writing (before Covid-19)? If you normally don't use technology, please describe a few strategies you do use.
6. What kind of technology do you usually (before Covid-19) use for student production of writing? If you normally do not use technology, what kinds of products do your students create to demonstrate writing proficiency?
7. Since Covid-19 have you been forced to use more technology when teaching writing?
8. Describe your process for teaching writing during Covid, including the technology you employ.
9. Since Covid, have your students used more technology to create writing products?
10. Describe how students demonstrate proficiency in writing during Covid, include any technology they use.
11. Has your perception about the use of technology to teach writing changed? If so, how? If not, why do you think that is?
12. Has your perception about students using technology to create products that demonstrate proficiency changed? If so, how? If not, why do you think that is?
13. Will you continue to use technology to teach writing once things return to "normal" (after Covid-19)?
14. What technology will you continue to use for writing instruction once things return to "normal" (after Covid-19)?
15. Explain your reasons for or against using more technology once teaching returns to "normal" (after Covid-19).
16. Will you continue to use technology as a means for students to demonstrate writing proficiency once things return to "normal" (after Covid-19)?
17. What technology will you continue to use as a means for students to demonstrate writing proficiency after things return to "normal" (After Covid-19)?
18. As a result of more virtual requirements for teaching and learning, do you feel more open and willing to explore, experiment, and use new technology? Please explain your answer.
19. If you are willing to do a follow-up interview with me, please provide your name and contact information below.