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Just What Online Resources Are Elementary Mathematics Teachers Using?

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The question of how elementary teachers choose tasks has been widely discussed in the field of education. However, these studies have not adequately addressed the increasing use of online resources by elementary mathematics teachers. The authors of this study surveyed 601 elementary mathematics teachers in the United States to examine the trends in the teacher selection of elementary math tasks from online resources. They discuss the relationship between different websites, various selection criteria used to find mathematics activities, and teachers' years of experience. They found a significant relationship between number of years teaching and the use of paid resources and the appeal of visual components of an activity, yet they did not find a significant relationship between years of experience and time spent searching online for an elementary math activity. In sum, this project, by closely examining the trends in teacher selection and use of elementary math tasks, sheds new light on the thinly acknowledged issue of the use of websites and tasks by teachers of elementary mathematics.

The subject of mathematics has long been associated with rigidity, relying heavily on structured materials such as textbooks and school curricular policies (Browne & Haylock, 2004; Remillard, 2005). Before the introduction of the Internet, "teachers merely followed their textbooks and the texts alone represented classroom instruction" (Remillard, 2005, p. 215). Many curriculums were fixed, with teachers simply acting as "curriculum deliverers" (Browne & Haylock, 2004, p. 4).

Today, school districts no longer require teachers to be curriculum deliverers, but often curriculum innovators (Browne & Haylock, 2004). Researchers found that teachers are curating both physical curricula and Internet resources in their general lesson planning (Hunter & Hall, 2018; Sawyer & Myers, 2018). Despite this shift, limited research has looked at the selections elementary mathematics teachers are implementing in their classrooms.

In the study described in this article, we expanded upon previous work completed with physical curricula and preservice teachers to look at in-service teachers' use of mathematics resources found online. Our research focused on identifying and documenting elementary mathematics teachers' criterion for curating resources and their habits in choosing such activities. After surveying 601 United States elementary mathematics teachers, we used their responses to answer the following research questions:

1. How often are elementary teachers across the United States searching for and using mathematics activities found online?
2. What websites do elementary teachers use to find mathematics activities?
3. How do elementary teachers rate common criteria for selecting mathematics activities found online?
4. To what degree does elementary teachers' years of experience influence each of these questions?

Literature Review

Use of Online Resources by Educators

Teachers' use of social media and online resources is becoming increasingly common (Hunter & Hall, 2018). Research conducted by the Bill and Melinda Gates Foundation (2014) found that 91% of teachers use websites to find and share both lesson plans and classroom ideas. In their study, they found that Scholastic.com (80%), YouTube (72%), Pinterest (69%), Discovery (64%), and PBS.org (61%) were the most popular sites among the respondents who taught pre-K through fifth grade. Research conducted by Sawyer and Myers (2018) suggests that 41% of preservice teachers enrolled in either elementary education or inclusive early childhood education undergraduate programs use not-as-trustworthy Internet resources when writing lesson plans.

A study conducted in 2017 (Hertel & Wessman-Enzinger) found that of the mathematics resources available online, 87% of the elementary teachers surveyed reported using Pinterest for lesson inspiration, second in popularity only to Google. Teachers make up a significant portion of the Pinterest community; education-related items are the second-most-highly searched resource on Pinterest, behind travel-related pins and have the highest number of followers per post (Hunter & Hall, 2018).

Every day, over half a million education pins are posted, many of which link to paid resources from sites such as Teachers Pay Teachers, where the average price ranges from $3 to $8 (Joyce, 2015). With regard to how teachers select online resources, researchers found that many teachers validate their choices based on user ratings (Clements & Pawlowski, 2012; Sawyer & Myers, 2018).

Selection of Activities From Online Resources

Preservice teachers indicated that when searching for activities online they most frequently justified their choices by describing the purpose of the activity. The three most common

justifications reported were curriculum application (47%), student-centered interest (26%), and assessment of students' learning (17%; Sawyer & Myers, 2018).

Research also suggests that teachers look to social networks (namely Facebook groups, Pinterest boards, and personal blogs) as a way to partake in informal professional development as well as collaborate with and learn from others in the field. Approximately 45% of the teachers surveyed reported that they used social networks "often" or "all the time" to seek information for lesson plans, forms, or templates (Hunter & Hall, 2018).

Rather than evaluating content from websites based on its developmental appropriateness, Sawyer and Myers (2018) concluded that the preservice teachers determined the effectiveness of an activity found online by the number of pins it had on Pinterest. According to research conducted by the Learning Research and Development Center at the University of Pittsburgh, search results on Teachers Pay Teachers are generated based on evaluative metadata, which includes the number of comments and ratings, regardless of whether they are positive or negative (Abramovich, Schunn, & Correnti, 2012). This evaluative metadata predicted which activities teachers chose, showing that the higher the popularity of a resource, the higher the sales (Abramovich, 2013).

Quality of Online Resources - Trustworthy vs. Not-as-Trustworthy

Unlike textbooks and other printed educational texts, which are usually vetted and screened before publication, anyone can publish an activity on the Internet (Israel, 2015). Hunter and Hall (2018) suggested two distinct categories of online resources: trustworthy and not-as-trustworthy.

In order to determine the trustworthiness of an online resource, it is important to consider the writer's background knowledge as well as whether the content on such sites has been vetted, compared, or screened. Trustworthy sites "include content monitoring based on research or expert consensus," while those with "no content monitoring capability" are considered not-as-trustworthy (Hunter & Hall, 2018, p. 4). For example, government-provided curricular materials, practitioner organizations such as the National Council of Teachers of Mathematics (NCTM), and state affiliate materials are considered trustworthy,while resources such as Twitter, Facebook, Pinterest, and Teachers Pay Teachers are not.

A recent study found that as of June 6, 2018, 61% of the top 500 free mathematics activities on Pinterest required a low level of cognitive demand from students, being coded as either memorization or procedure without connections using the Smith and Stein (1998) Task Analysis Guide. Further, only 1% of these activities were coded as doing mathematics, which requires the highest level of cognitive demand from students (Wismer, Dick, Shapiro, & Sawyer, 2019).

Theoretical Framework

This investigation uses Coiro, Knobel, Lankshear, and Leu's (2014) New Literacies Theory (NLT) lens, which is concerned with individuals' views that are demonstrated in their implementation of digital tools. NLT considers views of learning that can be effectively leveraged to meet learners' needs by harnessing emerging technology and helps explain teachers' usage and adaptation of resources in this digitally rich age. NLT also considers modern views teachers must have in order to meet their students' needs, such as the ability to create new materials, remix old ideas, and discover new ways of using resources (Corio et al., 2014).

NLT emerged from observing how individuals use social media and how they use out-of-school literacy in their lives (Greenhow, Robelia, & Hughes, 2009; Seglem, Witte, & Beemer, 2012). Dredger, Woods, Beach, and Sagstetter (2010) described NLT as a progression of enacted views people progress through as follows:

1. From solely considering their individual knowledge to valuing collective intelligence (e.g., valuing ideas shared in other resources).
2. From being a passive observer of materials to an active participant in selection of materials (e.g., actively considering what to implement in the classroom).
3. From viewing sole ownership of ideas to contributing ideas to a wider audience (e.g., uploading ideas to Pinterest).
4. From solely considering a centralized expert in the field to recognizing distributed expertise (e.g., searching the Internet for resources).
5. From only using materials as they were created to adopting a view of creative rule-breaking (e.g., creatively adapting a document that was found online).
6. From enacting materials as the creator intended to adapting implementation (e.g., creating an enacted change).
7. From minimal changes to meaningful, high-quality innovative activities (e.g., innovating to something that is their own, new, and valuable)

A generational gap can be seen in NLT (Corio et al., 2014). Novice teachers are often considered to be passive observers of the materials they collect and many remain in the lower levels of the New Literacies hierarchy by doing things such as sharing widely with unknown customers through Teachers Pay Teachers. Teacher educators want to reverse this trend by teaching teachers the skills necessary to curate by analyzing aspects of lesson materials that are helpful, synthesizing multiple resources, and applying their knowledge to adapt materials in ways uniquely situated to their students (Sawyer & Myers, 2018).

Methods

This study employed a survey methodology in which respondents answered a series of questions, most of which included a set of predefined options. We collected participants' years of experience, the Internet resources they use, the duration and frequency of their searches for activities on Internet resources, and their rankings of the importance of specific criteria when selecting activities from online resources (see Appendix A for the full survey).

Descriptive statistics were used to analyze demographic characteristics such as years of experience and the websites teachers frequented. To determine significant relationships between various characteristics, correlational analysis was applied to the data using the Pearson chi-square test for independence and Spearman's rho correlation (Pallant, 2013).

Sampling Method

Elementary mathematics teachers were surveyed using Qualtrics (2019), an online surveying platform allowing for anonymous responses from links. The participants in this study were recruited by means of a convenience sample with a snowball sampling component (Weiss, 1994). The survey was sent by email to the chairs and presidents of all 50 NCTM state affiliate organizations, as well as state affiliated presidents for the Association of Mathematics Teacher Educators (AMTE), to be disseminated to their members. The link to the survey was also posted on multiple forms of social media, including Twitter (using hashtags such as #elemmathchat, #edchat, #mathchat, #elemchat, #mtbos, #iteach, #iteachmath, and #numbersenseroutines), Facebook (in

pages and private groups geared toward elementary teachers and mathematics teacher educators who could forward on to elementary teachers), and Instagram (using hashtags similar to Twitter).

The survey received responses from 48 US states, as well as Washington DC and US Territories. It was open for approximately 7 weeks, and of the 601 respondents, 96% consented to participate in the study and indicated they were teachers of elementary mathematics, resulting in a sample of 583 elementary mathematics teachers. Our sample included teachers of various grade levels, with the majority (96%) teaching kindergarten through fifth grade (Figure 1). The remaining respondents taught either sixth grade (14) or elementary special education (4). The largest group of participants (23%) had 0-5 years of experience, with the mean number of years of experience being in the 11-15 years category (Figure 2).

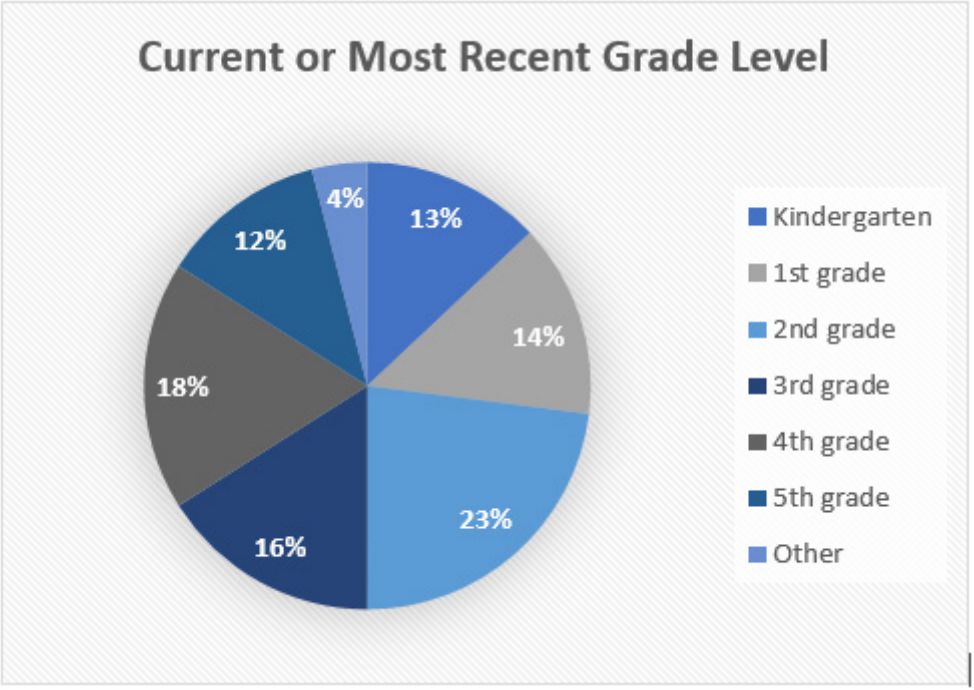

Figure 1. *Current or most recent grade level taught.*

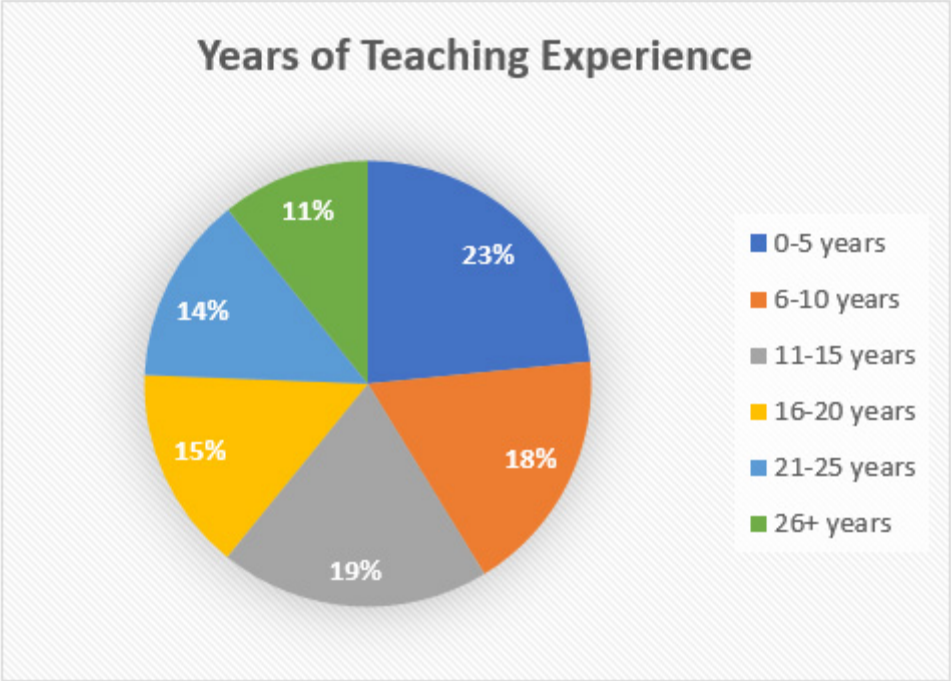

Figure 2. *Years of teaching experience.*

Data Analysis

Qualtrics (2019), the software through which the survey was conducted, provided data and reports for each question. We used quantitative methods to determine the significance of our data using MiniTab software (Meyer & Krueger, 2001). To answer if there was a relationship between the continuous variables, we used the Pearson chi-square statistical method to compare the two unrelated categorical events (Bollen, 1989). Since we had a large sample size, we selected alpha as 0.05, thus setting the criteria that the *p*-value must be less than 0.05 for us to reject the null hypothesis that there was no relationship between the two variables.

The ranked data were analyzed for correlation using Spearman's rho rank order correlation. We wanted to determine if an association existed between the ranked criteria for their selection of a mathematics task found online and the teachers' years of experience. Since we preselected our alpha as 0.05, when the *p*-value was less than alpha there was evidence of a correlation.

The ranking was scored 1 = *most important* and 9 = *least important*, and the years of experience were grouped 0-5, 6-10, 11-15, 16-20, 21-25, and 26+ years. For significant tests in which the numbers were not sufficiently large to complete the test, the years of experience were collapsed to 0-15 and 16+ years. A significant positive correlation indicated that individuals with fewer years of experience teaching found the variable more important than teachers with more years of experience.

Results

The data describe how often elementary teachers search for and use mathematics tasks found online, where they go to search for these resources, and how they choose

mathematics tasks found online. In each section, our first three research questions are answered, as well as how they related to the elementary teachers' years of experience (RQ4) within each section. Throughout the results we refer to the survey participants as teachers.

RQ1: Frequency of Searching for and Using Mathematics Activities Found Online

When asked, "Have you ever searched online for an elementary mathematics activity?", 516 teachers (99%) responded "yes." Of the 521 elementary mathematics teachers who responded to this question, only five individuals did not use mathematics activities found online (Table 1). Each of these five individuals fits into one of the following experience categories: 6-10, 11-15, 16-20, 21-25, and 26+. Unlike the other categories, all of the teachers in the 0-5 years of experience category indicated using online resources.

Table 1
Do Teachers Search Online for Elementary Mathematics Activities?

Response			
Years of Experience	**Yes**	**No**	**Total**
0-5	122	0	122
6-10	92	1	93
11-15	101	1	102
16-20	76	1	77
21-25	70	1	71
26+	55	1	56
Total	516	5	521

When asked, "How often do you search online for elementary mathematics activities?," the teachers responded with average scores ranging from 2.9 to 3.2, with value 3, indicating teachers typically used online resources weekly (Table 2). However, the 3.2 average score for the teachers with 16+ experience and the 2.9 average score for less than 16 years of experience suggested testing for a relation.

Table 2
How Often Elementary Mathematics Teachers Search Online

How Often Do You Search Online for Elementary Mathematics Activities?								
Years of Experience	**Daily (1)**	**Multiple Times a Week (2)**	**Weekly (3)**	**A Few Times a Month (4)**	**Monthly (5)**	**A Few Times a Year (6)**	**Total**	**Average**
0-5	11	48	17	32	9	1	118	2.9
6-10	5	31	24	22	4	6	92	3.1
11-15	12	36	20	17	3	8	96	2.9
16-20	8	17	20	15	7	5	72	3.2
21-25	8	17	9	20	7	5	66	3.2
26+	4	19	12	11	1	5	52	3.0
Total	48	168	102	117	31	30	496	-

To verify, we determined whether a statistically significant difference existed between teachers' years of experience and their usage of online resources (across all frequencies). Our original hypothesis was that teachers with more teaching experience would be less inclined to search for activities online. However, when we conducted a chi-squared test, no statistically significant difference ($p = 0.097$) was found among years of experience and the frequency of searching online for mathematics activities.

When asked, "How often do you use [free online activities or paid online activities] in your elementary mathematics instruction?," 314 teachers (63%) indicated that they used free online mathematics activities at least half of the time (Table 3), while 198 teachers (40%) indicated that they used paid online mathematics activities at least half of the time. Only nine teachers (2%) indicated that they never use free online mathematics activities, while 94 teachers (19%) shared that they never use paid online mathematics activities in their instruction.

We conducted a Pearson chi-square test for independence to determine a significant relationship existed between teachers using online resources and their years of experience. With $p = 0.941$, we found no significant relationship among the general use of online resources and teachers' years of experience, since the p value was greater than our alpha of 0.05. This implies that experienced teachers use mathematics resources found online as frequently as novice teachers.

Table 3
Responses to the Question, How Often Do You Use [Free Online Activities or Paid Online Activities] in Your Elementary Mathematics Instruction?

Resource	Always	Most of the Time	About Half the Time	Sometimes	Never
Online activities (free)	59 (12%)	150 (30%)	105 (21%)	172 (35%)	9 (2%)
Online activities (paid)	33 (7%)	96 (19%)	69 (14%)	203 (41%)	95 (19%)

RQ2: Websites Where Elementary Teachers Find Mathematics Activities

Elementary teachers reported using a variety of websites (Figure 3) when asked, "Where have you searched for online elementary mathematics activities?" Eighty-nine percent of teachers (441) reported searching on Teachers Pay Teachers, revealing that this resource was the most commonly used website to find mathematics activities, followed by Pinterest (74%) and then Google (68%). The five most common "other" responses included state resources, Illustrative Mathematics, Youcubed, Khan Academy, and Gfletchy.com. Of these other responses, we consider state resources, Illustrative Mathematics, and Youcubed as trustworthy because they have an established peer review system.

We conducted a Pearson chi-square test to determine whether teachers with 0-15 years of experience search for mathematics activities on different online sites than teachers with 16+ years of experience (Table 4). Six sites were identified as the most used sites: Education.com, general Google search, NCTM & State Affiliates, Pinterest, Teachers Pay Teachers and YouTube. All other websites identified by participants were grouped into the category named "Others." The chi-square test produced a *p*-value of .004, which is less than our alpha, thus we found significant differences.

The largest difference between selected websites and years of experience in the data occurred for NCTM & State Affiliates websites. Only 28% of teachers who had 0-15 years of experience selected using NCTM & State Affiliated websites compared to 43% of teachers who had 16+ years of experience. The data indicated that teachers who had taught for 0-15 years used NCTM & State Affiliates significantly less than those with 16 or more years of teaching experience.

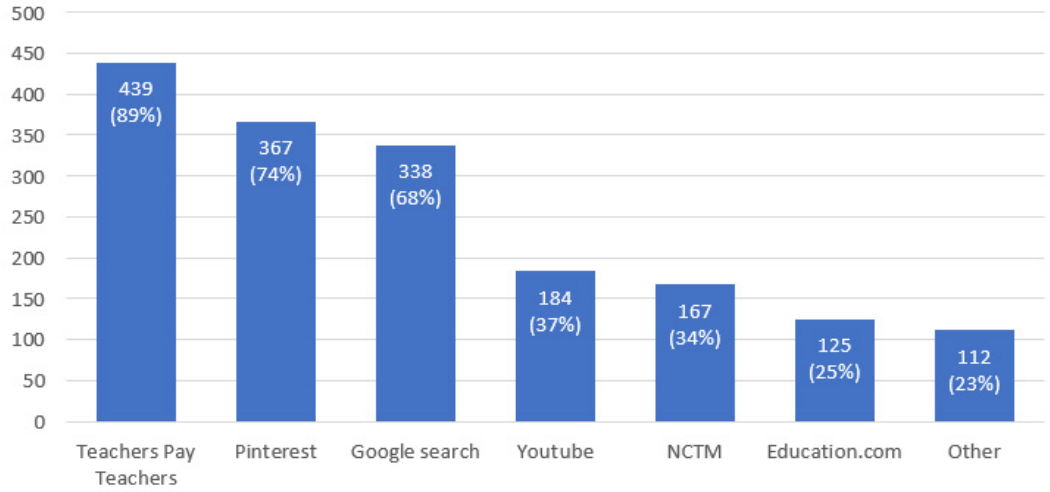

Figure 3. *Where respondents search online for elementary mathematics activities.*

Table 4
Websites Are Teachers Using

	Years of Experience		
Resource	0-15	16+	Total
Education.com	84	41	125
General Google search	208	130	338
NCTM/state affiliates	85	82	167
Pinterest	246	121	367
Teachers Pay Teachers	285	154	439
YouTube	115	69	184
Other	60	52	112
Total	1,083	649	1,732

RQ3: Elementary Teachers Ratings of Common Criteria for Selecting Mathematics Activities

When asked, "Please rank the importance of the following criteria you use when selecting elementary mathematics activities online," 357 teachers (91%) ranked "Alignment to Standards" as the most important criteria with an average rating of 1.6 (Table 5). The

second and third most important criteria were "Perceived Student Engagement," with an average rating of 3, and "Level of Difficulty," with an average rating of 3.8.

Table 5
What Is Most Important When Selecting Online Resources

Criteria	Rank									Total	Average Rating
	1	2	3	4	5	6	7	8	9		
Alignment to standards	357	59	36	19	9	5	9	2	0	496	1.6
Perceived student engagement	48	159	143	75	45	19	5	1	1	496	3.0
Level of difficulty	10	132	100	96	84	44	22	8	0	496	3.8
Fun activity	27	58	87	88	105	69	40	21	1	496	4.3
Perceived student success	8	32	74	129	117	81	47	8	0	496	4.5
Price	40	40	31	32	40	107	96	104	6	496	5.5
Visual Appeal	3	8	14	37	62	98	114	152	8	496	6.4
User Rating	0	4	7	18	31	72	161	192	11	496	7.0

Note. Item read as follows: "Rank the following criteria as 1 being the most important and 9 being least important when selecting online resources."

These three criteria were similarly important to elementary teachers across all experience levels. The lowest rated criteria were "Price," with an average rating of 5.5, "Visual Appeal," with an average rating of 6.4, and "User Rating," with an average rating of 7. The lowest rated criteria differed across years of experience.

Since experienced teachers rated criteria differently than teachers with less experience, we conducted the Spearman's rho test to determine a correlation and statistical difference between teachers' years of experience and their ranking of specific criteria (Table 6). No association was found between teachers' selection of alignment of standards, student engagement, or level of difficulty and their years of experience, as all the teachers identified each criterion as being somewhat to very important.

Table 6
Correlation Between Rank and Years of Experience

Criteria	ρ	*p*
Alignment to standards	-0.035	0.353
Fun activity	-0.029	0.402
Level of difficulty	-0.033	0.347
Perceived student engagement	-0.030	0.408
Perceived student success	-0.044	0.210
Price	0.207	0.000*
User Rating	-0.034	0.351
Visual Appeal	-0.85	0.017
* $p < 0.0005$		

On the other hand, a significant positive correlation with ρ = 0.207 ($p < 0.0005$) was found between the years of experience and the importance of the price of the activity. Teachers with fewer years of experience ranked the price of the activity as more important, whereas more experienced teachers ranked the price as less important, suggesting that high costs are more of a deterrent for novice teachers.

We also found visual appeal to be statistically significant, with a negative correlation between number of years teaching and the importance of visual appeal when selecting an activity (ρ = -0.85, $p = .017$). In other words, the more experience teachers have, the more they indicated caring about visual appeal when selecting an activity.

The only criterion that all elementary teachers rated as not important was "User Rating." No statistically significant difference ($p = 0.351$) was found between years of experience and the importance of an activity's rating. Thus, the data indicated that uniformly, the elementary teachers did not find "User Rating" as an important criterion when selecting elementary mathematics tasks online.

Discussion

Following is a summary of the findings for each of our four research questions based on analysis of our data.

1. The data indicated that elementary teachers across the United States with access to the Internet typically searched for and used mathematics activities found online weekly.

2. Elementary teachers most often searched for elementary mathematics activities on Teachers Pay Teachers (89%), Pinterest (74%), and general Google searches (68%), all of which are considered not-so-trustworthy websites.
3. Elementary teachers selected certain mathematics activities from online resources because they believed the activity aligned with standards, engaged students, and were appropriately difficult.
4. Years of experience did not necessarily influence teachers' frequency of use of mathematics activities found online, but it did affect the websites they used, such as NCTM & State Affiliates, and what they found to be most important when looking at mathematics activities, such as visual appeal for more experienced teachers and price for less experienced teachers.

Of these findings, we highlight the following: elementary mathematics teachers with Internet resources are using activities found online in their mathematics classrooms; Teachers Pay Teachers was the most commonly used website; and price may deter novice teachers from using certain materials.

Everyone Is Doing It

We found that the teacher respondents searched online for mathematics activities weekly regardless of their years of experience. Since elementary teachers said they looked across different websites and resources, NLT would view this activity as teachers valuing distributed expertise (Corio et al., 2014).

Dredger et al. (2010) noted that, typically, a generational gap is seen between individuals who hold these values in NLT. For example, creative rule-breaking may be viewed as plagiarism by veteran teachers. However, our data suggest that elementary mathematics teachers value distributed expertise since they are all searching online for mathematics activities.

The data also revealed that almost 90% of the teacher participants used Teachers Pay Teachers. Teachers are apparently using not-as-trustworthy websites and must now become critical consumers of resources. Previously, a peer review process was used to determine the quality of materials. Without this process, teachers must consider the quality of resources and carefully look for misconceptions, invalid mathematical concepts, or low levels of cognitive demand.

In a separate study, Sawyer, Dick, Shapiro, and Wismer (2019) found only 1% of the top 500 elementary mathematics activities on Pinterest to be at the highest level of cognitive demand, doing mathematics (Smith & Stein, 1998). Since quality is not guaranteed on such sites, in-service and preservice teachers need to learn to determine the quality of mathematics activities for themselves and, therefore, either choose to continue searching for another resource or, consistent with NLT, adapt the resource to better fit classroom needs.

Fast Changing Times

As a result of the constantly evolving and expanding availability of Internet resources, our research found that the use of online resources is changing so frequently that by the time a paper is published, the data are already out of date. This was particularly clear looking at Hertel & Wessman-Enzinger (2017). Despite reviewing teachers' utilization of mathematics activities found online, Teachers Pay Teachers was not a focus of the study. Our survey,

however, found that Teachers Pay Teachers was the most commonly used online resource, showing that online trends have already changed.

Our study's survey was distributed in June 2018; thus, the data collected describe teachers' responses at that time. Mathematics education researchers need to pay attention to what is currently occurring in the classroom in order to stay abreast of the ever-changing trends. Therefore, older or outdated research might not be the best indicator of what is seen in the classroom, and teacher educators need to know this to be aware of this limitation in the peer review cycle.

Price Matters, Particularly to Novice Teachers

The data indicated a correlation between the years of experience and the importance of the price of the activity, revealing that the least experienced teachers cared most about the price of a mathematics task found online. Trustworthy websites like NCTM.org require membership fees, while not-as-trustworthy websites like Teachers Pay Teachers are often free. This fact could explain the relationship we found between teachers' experience and an activity's cost.

Research reveals that "nationally, teachers earn 19% less than similarly skilled and educated professionals" (National Education Association, 2018). This circumstance, combined with the fact that new teachers make less than their more-experienced counterparts, may be a contributing factor as to why price matters more to novice teachers.

Rating Might Not Matter

Previous studies indicated that preservice teachers valued the number of pins associated with a document on Pinterest when selecting resources for lesson planning (Sawyer & Myers, 2018). However, the data suggest that the rating of the material was least important to elementary mathematics teachers. Since Sawyer and Myers' (2018) study was conducted with preservice teachers, it could indicate that practicing elementary teachers rank rating as less important, or that the other criteria suggested in the survey were more valuable. It may also indicate that the teachers in our study did not want to disclose how important they truly believed user rating to be.

Implications

The data suggested that elementary teachers are using not-as-trustworthy websites weekly, meaning that teachers are regularly making important decisions about the quality of resources. Publishers are no longer the sole gatekeepers of knowledge (Dredger et al., 2010), which places the peer reviewer process on the shoulders of the teachers who are selecting the tasks. Thus, to better equip teachers, mathematics teacher educators should teach critical analysis of online mathematics resources to in-service and preservice teachers to help with this process. Further, professional development and preservice coursework should focus on helping teachers create their own activities, as teachers need training in order to become their own quality control.

Another implication of this research is that national organizations such as NCTM could create a website that provides a peer review process identifying high quality mathematics resources free to the public. Websites such as Teachers Pay Teachers could also offer a peer review rating system for materials prior to posting to the site. The independent third-party participant could evaluate whether activities were mathematically valid and provided a

high level of rigor. This approach would help prevent a resource's popularity from determining its quality.

Our data indicated that price matters more to less experienced teachers, and memberships to professional organizations (which provide the trustworthy resources) are on the decline (Yohn, 2016). Yohn explained, "The proliferation of online content has led to vast and often free access to the types of information, insights, and training that professionals used to be able to access only through association membership and industry conferences" (paragraph 6).

If new teachers are to use more resources from trustworthy websites, perhaps they need better access. Thus, organizations should rethink how they will gain these teachers' memberships, because their resources are of high quality. Respected organizations could provide a free 1-year membership for first year teachers, helping to support the needs of new teachers while promoting the organization to a new generation of educators.

Limitations and Future Work

We acknowledge that, while the teachers in our study had access to the Internet (thus allowing them to take our survey), some elementary mathematics teachers do not. Larger than most other surveys, we examined responses from 48 of the 50 states. However, our results would have been more accurate if our sample had included individuals without computer access. Additionally, we found nearly all of our teachers through online platforms, which may have skewed our results to reflect only people who view those platforms. Some respondents also were sent our survey from NCTM or AMTE email blasts, indicating that they were members of either organization, making these individuals more likely to use resources from those websites. To reiterate, our results may not be reflective of teachers in rural areas and communities, where Internet access is more limited.

Future work with this project could involve the same type of analysis with other subjects, as well as the study of different online resources that rise in popularity within the next few years, many of which most likely do not yet exist. With the ever-growing and expanding resources available online, keeping research current and representative of what teachers are using in their classrooms it is important.

Conclusion

With the majority of teachers using online resources to find activities for their classrooms, highlighting trends in their activity selection is important. Compared to the Hunter and Hall (2018) study published 1 year ago, our data illustrates the rapidly changing online options available to teachers. Since we know that elementary mathematics teachers with Internet access are using online resources to find activities for their classrooms, teacher educators must support them in the selection and implementation of these elementary mathematics activities to better meet the needs of all of their students.

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