# Investigating teachers' exploration of a professional development website: An innovative approach to understanding the factors that motivate teachers to use Internet-based resources

# Investigation de l'exploration par les enseignants d'un site Web de développement professionnel : une approche innovatrice pour comprendre les facteurs qui motivent les enseignants à utiliser des ressources dans Internet

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## Abstract

This qualitative study examined an innovative methodology, combining screen capture technology and a retrospective think aloud, for exploring the use of Internet-based resources by elementary teachers. Pre-service and in-service teachers explored *The Balanced Literacy Diet*, a free, interactive, and evidenced-informed professional development website. As participants navigated through this complex site, each visual step was captured using Camtasia Studio, a screen recording computer software program developed by TechSmith. Immediately following their 10-minute exploration, participants revisited their online choices virtually and verbalized their thoughts while viewing their screen recording. Qualitative analysis confirmed the usefulness of the methodology and provided insights about the factors that motivate teachers to use professional development websites. Results of the analysis can contribute to the ongoing development of high quality online learning environments.

## Résumé

Cette étude qualitative s'est penchée sur une méthodologie innovatrice combinant les technologies de saisie d'écran et la pensée rétrospective à voix haute pour l'exploration de l'utilisation des ressources dans Internet par les enseignants de l'élémentaire. Des enseignants en formation initiale et des enseignants sur place ont exploré *The Balanced Literacy Diet*, un site Web de perfectionnement professionnel gratuit, interactif et s'appuyant sur des données probantes. Tandis que les participants naviguaient dans ce site complexe, chaque étape visuelle était captée à l'aide de Camtasia Studio, un logiciel d'enregistrement de l'écran développé par

TechSmith. Immédiatement après leur exploration de 10 minutes, les participants ont revisité virtuellement leurs choix en ligne et ont verbalisé leurs réflexions en regardant l'enregistrement de l'écran. L'analyse qualitative a confirmé l'utilité de la méthodologie et a fourni des perspectives sur les facteurs qui motivent les enseignants à utiliser les sites Web de perfectionnement professionnel. Les résultats de l'analyse peuvent contribuer au développement continu d'environnements d'apprentissage en ligne de grande qualité.

## Introduction

Access to professional learning opportunities and resources is crucial for the improvement of elementary teachers' educational practice (Kao, Wu & Tsai, 2011). Given that teachers are increasingly turning to the Internet for their professional learning (Charalambousa & Ioannou, 2011), it is essential to examine how teachers use professional websites and web-based technologies. In particular, gathering data about how teachers evaluate and interpret web-based features while navigating professional websites is important input into tool improvements and the development of online learning environments (UNESCO, 2009). The purpose of this paper is to introduce a methodology, combining screen capture technology and a retrospective think aloud procedure, for exploring the use of Internet-based resources by elementary teachers. Information generated from the methodology presented in this paper can benefit educational website designers and policy makers by helping them to anticipate and meet the needs of teachers in their search for high-quality professional resources.

### Online Learning Environments

A report from The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2009) states that research examining online learning environments "should be oriented towards discovering what works, what does not work, how to improve the learning process, and what new features learning resources need" (p. 88). This report emphasizes the importance of evaluating the quality of present and future online learning environments in order to better understand how web-based features and technologies are used, particularly as the demand for online learning opportunities and resources increases (UNESCO, 2009).

Teacher participation in online professional learning opportunities is likely to occur for personal reasons rather than extrinsic factors such as course credits (Brooks & Gibson, 2012). Topics of interest, connections to current practice, and the potential for learning a new teaching strategy or tool are reasons for use reported by teachers who seek online resources for their professional learning (Brooks & Gibson, 2012). Furthermore, teachers are generally interested in using the Internet to facilitate their learning. They regard web-based resources as a primary source of professional information—the Internet provides a broad range of information and ideas related to their practice (Charalambous & Ioannou, 2011).

Most studies examining how teachers utilize websites have gathered data through questionnaires and interviews (Duncan-Howell, 2010; Hur & Brush, 2009; Kao, et al. 2011). These methods offer information about teachers' attitudes towards online professional learning. However, the ability to generate information on navigational experiences in such studies has been limited by participants' responses being based on their recollection of past events. A method that tracks teachers' thought processes as they make online choices is necessary to provide further insight into how teachers use online resources.

**Think Aloud Methodology**

The think aloud methodology was developed based on the techniques of protocol analysis by Ericsson and Simon (1984, 1993) and has been shown to provide direct data about the reasoning process (van Someren, Barnard & Sandberg, 1994). The resulting protocols have shown to "contain information that reveals the subject's control and evaluative processes and goals" (Ericsson & Simon, 1993, p. 264). Verbal reports are usually based on information held in short term memory and provide information about experiences and knowledge that cannot easily be accessed by more traditional observations and interviews (Ericsson & Simon, 1993).

In verbal protocol analysis, verbalizations can be made either during decision-making or after, but both of these types of think aloud – concurrent and retrospective – have strengths and weaknesses (Kuusela & Paul, 2000; van Someren, et al., 1994). The concurrent procedure has been widely used as an effective approach to monitoring thought processes whereby thoughts are verbalized while performing a task (Ericsson & Simon, 1984; Fox, Ericsson & Best, 2011; Wineburg, 1991). An advantage of the concurrent think aloud is that cognitive processes, such as reasoning and decision-making, can be verbalized at the same time that the problem is being solved. However, the concurrent think aloud is limited by the fact that the act of thinking aloud requires cognitive resources that can sometimes detract from the decision-making process itself (Cotton & Gresty, 2006).

The retrospective procedure has the advantage of freeing cognitive resources while participants are completing a task (Cotton & Gresty, 2006) but is limited by the fact that after a task has been completed it is difficult for participants to accurately recall their decisions and why they made them (Fox, et al. 2011). The retrieval process that occurs during the retrospective reporting may not produce all of the information that actually appeared in working memory during the task (van Someren et al., 1994).

Studies have demonstrated the benefits of using concurrent think aloud protocols as a method to collect and analyze data on the use of online learning environments (Cotton & Gresty, 2006; Damico & Balidon, 2007). For instance, Armstrong (2011) successfully employed the think aloud method to describe experiences and perceptions of online courses by undergraduate students. Also, Barzilai and Zohar (2012) demonstrated how the technique of thinking aloud while making online choices makes it possible to study thinking in context.

The present study examines a "virtual revisit" retrospective think aloud for exploring the use of Internet-based resources by elementary teachers. The virtual revisit is a variation of the retrospective think aloud method and allows participants to review and comment on a visual recording of how they interacted with a particular website. The goal of the virtual revisit is to aid recall of original events and thought processes by using a screen capture recording of participants' navigational experiences. The virtual revisit method has the potential to avoid the limitations of concurrent and retrospective techniques and contribute to improvements in the quality and usability of online professional learning resources.

**Current Research Questions**

The purpose of this qualitative study was to examine a methodology, combining screen capture technology and a retrospective think aloud procedure, for exploring the use of Internet-based resources by elementary teachers. The study addressed the following questions:

1. Is the "virtual revisit" retrospective think aloud an effective method for exploring the use of Internet-based resources by elementary teachers?

2. What factors motivate teachers to use an online professional development resource?

## Methods

**Context of the Study**

The present study was undertaken within the context of the development and refinement of a powerful new online professional resource. *The Balanced Literacy Diet* website (www.LitDiet.org) is a unique evidenced-informed literacy website that provides free professional learning resources such as virtual tours of exemplary classrooms (PreK-6), video clips of expert teachers explaining and demonstrating effective educational practices, detailed lesson plans, photos of teaching materials, and exemplars of student work (see Figure 1). The site is content rich, highly complex and interactive; thus it offers an ideal context in which to examine elementary teachers' use of online educational resources while, at the same time, generating data which can serve to further develop the effectiveness of the site as a professional development resource.
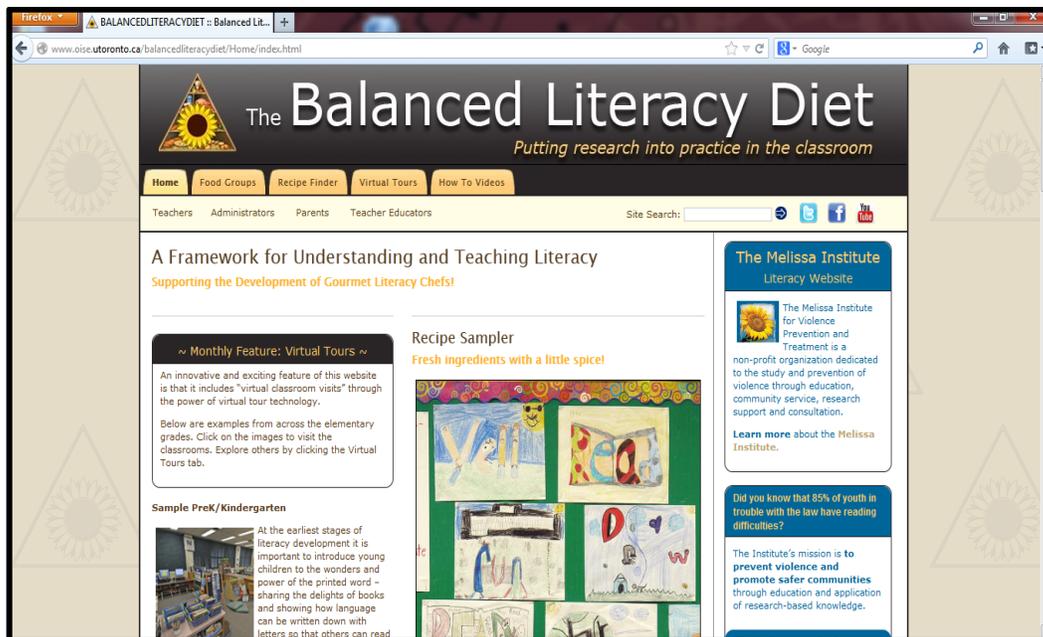


*Figure 1.* The Balanced Literacy Diet website.

**Research Design**

Qualitative methods enable researchers to examine social practices and processes and can be particularly useful for discovering the effectiveness of professional development programs (Starks & Brown Trinidad, 2007). Insights into how individuals experience a particular phenomenon and the processes involved in a particular situation can be acquired through qualitative research (Rowan & Huston, 1997). This study utilized a general inductive approach to analysis (Thomas, 2010) to explore the virtual revisit methodology as a method for examining the use of a complex multi-media professional development website by elementary teachers. The primary purpose of an inductive approach is to "allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data, without the restraints imposed by structured methodologies" (Thomas, 2010, p. 238).

**Participants**

Seven pre-service student teachers and four in-service elementary teachers (N=11) volunteered to participate in this study and all participants completed informed consent forms. The pre-service teachers (n=7) were all enrolled in a two-year Master of Arts and teacher certification program. Pre-service teachers were invited to participate in the study by the primary researcher. Pre-service teachers who decided to participate in the study met with the primary researcher during the spring term and had therefore gained classroom teaching experiences during the practicum component of their program. These pre-service teacher candidates had experience ranging from kindergarten through sixth grade and included five female pre-service teachers and two male pre-service teachers.

The in-service teachers were approached by the primary researcher and volunteered to participate. In-service teacher participants (n=4) taught grades ranging from second through sixth and included three female teachers and one male teacher. Schools in which the in-service participants taught were located in a large metropolitan area.

**Data Collection**

Observations were conducted individually and occurred at a computer terminal with access to *The Balanced Literacy Diet* website ([www.LitDiet.org](www.LitDiet.org)). Participants were asked to explore the website for 10 minutes. Each visual step made by the participants was captured using the computer software program Camtasia Studio (Uppal, 2011). Participants were not given a specific task to complete but rather were asked to use the resource as they would normally do when seeking information related to their practice. The task protocol was read aloud as follows:

> Explore the website as you would normally do when looking for information online related to your teaching practice. You will explore the website for 10 minutes.

Following the 10-minute navigation, participants were asked to view the recording of their exploration while simultaneously thinking aloud about their choices. Participants were given the following instructions:

> Now that you have finished exploring the website for 10 minutes, I would like you to think aloud while you view a recording of your exploration of *The Balanced Literacy Diet* website. What I mean by think aloud is that I want you to tell me everything that you

were thinking from the time you began exploring the website until the end of your exploration. It is most important that you keep talking (adapted from Ericsson & Simon, 1993, p. 378).

Traditionally in concurrent think aloud procedures thoughts are verbalized while participants are performing a task (Ericsson & Simon, 1984). In the present study, a virtual revisit retrospective think aloud was employed whereby the video recording was viewed immediately following participants' navigational experience. The screen recording ran continuously as participants verbalized their thoughts. This resulted in 10 minutes of think aloud data for each participant.

The virtual revisit enabled participants to access their interactive decision making immediately after viewing a recording of the event. This modified retrospective think aloud method aims to aid recall of original events and authentic thoughts by using a video stimulus and has the advantage that it enables participants to focus on what they were doing at a particular time while freeing them from having to do the activity and simultaneously talk about it (Cotton & Gresty, 2006).

**Data Analysis**

Data analysis in qualitative research involves reducing the data into themes as a result of repeated coding, comparisons and categorizations (Creswell, 2007). To answer the research questions the think aloud transcripts were first "read reflectively to identify relevant categories" (Gibbs, 2007, p. 50). Phrases within the transcripts were categorized and initial codes were identified and labeled. Code labels emerged as a result of a direct phrase or use of language by participants. For example, one participant used the word, "credible" to describe the trustworthiness of the site. These types of codes can be defined as "in vivo codes," names that are the exact words used by participants (Creswell, 2007). Other code labels were drawn from short descriptors that best captured the information.

A review of the transcripts allowed categories to be further refined and interconnected (Gibbs, 2007). The data were reassembled into groupings based on relationships and patterns with and among the categories identified in the data. Four major themes were identified as a result of the analysis. The first two themes, (1) Reasoning about behaviour, and (2) Producing themes related to higher cognitive processes, relate to the first research question. The second two themes, (3) Evaluating information and presentation, and (4) Contributing information to professional practice, relate to the second research question. The consistency and frequency of the identified themes across the participants was also established.

In summary, the think aloud protocols were coded and categorized during data analysis (Corbin & Strauss, 2008). Codes, categories and themes were developed inductively in order to uncover characteristics and patterns from the think aloud transcripts (Creswell, 2007). The codes that emerged from the data were categorized into specific themes based on each research question.

<div align="center"><b>Findings and Discussion</b></div>

Findings are presented and discussed in the following two sections highlighting the effectiveness of the virtual revisit think aloud method and the participants' motivation towards using *The Balanced Literacy Diet* website. Tables 1 and 2 provide a short definition of each of the identified themes.

Table 1
*Effectiveness of the Virtual Revisit Think Aloud Methodology*

| Theme | Definition |
| --- | --- |
| Reasoning about Behaviour | Referring to clarifications, explanations and rationales of participants' online behaviour and navigational choices |
| Higher Cognitive Processes | Referring to:<br>Analyzing - examining and relating website content to current or future practice<br>Reasoning - clarifying, explaining and providing rationales of online behaviours and navigational choices<br>Creative thinking - forming concepts and constructing ideas in relation to their future goals and lesson plans |

Table 2
*Factors that Motivate Elementary Teachers to Use an Internet-Based Resource*

| Theme | Definition |
| --- | --- |
| Evaluating Information and Presentation | Referring to:<br>Quality of information - the reliability, accuracy and credibility of the website contents, trustworthiness of source, and including references made to the authority and organizational support<br>Ease of use - the usability, readability and efficiency, and including references to the simplicity, logical navigation, loading speed and comprehensiveness of the content<br>Appearance - the website's use of color, design, graphics and images and including references to the quality of the web-based technologies (e.g., photographs, videos, virtual tours) |
| Contributing Information to Professional Practice | Referring to:<br>Usefulness of information - teaching experience, knowledge gained, and overall usefulness of the web-based technologies |

**Is the "virtual revisit" retrospective think aloud an effective method for exploring the use of Internet-based resources by elementary teachers?**

To determine the effectiveness of the virtual revisit method for exploring the use of Internet-based resources by elementary teachers think aloud protocols were transcribed and analyzed for patterns and themes. This analysis revealed two major themes concerning the effectiveness of the virtual revisit retrospective think aloud: (1) Reasoning about behaviour, and (2) Producing

themes related to higher cognitive processes. The following two sections provide a summary of each of the identified themes concerning the first research question. Direct quotes are included to represent each theme.

**Reasoning about Behaviour**

As a result of the virtual revisit think aloud, participants' verbalizations moved beyond simple descriptions of their online actions to include reasons for their behaviours. Reasoning offered rich descriptions about participants' decisions and online actions. As participants viewed the screen recording of their website navigation, they extended their descriptions to include a rationale and clarified the reasons for making their navigational choices. For instance, one pre-service teacher extended the simple statement: "I decided to go into the grade 5/6 category" by offering a reason for her choice:

> I decided to go into the grade 5/6 category because I had just been talking about motivation in the older grades and I was considering what would be the different types of tasks that you would have that would be even more engaging and motivating than I've seen in the younger grades.

Another pre-service teacher participant clarified her thinking as she viewed her screen recording:

> My eye got drawn right away to the left hand side of the screen that was going through the sample sections and I think that's a really great way to put it, because teachers right away want to see what activities are available.

Reasoning also provided insights into the difficulties the participants had as they navigated through the website:

> I was trying to click on this picture to view the video instead of on the video camera. I understood how to use it after a while but it was just more intuitive to just click on the video like you would if you had gone and embedded the video on a Facebook page.

Verbalizations also provided information about why certain website tools or features were abandoned. For example, an in-service participant states the reason why she stopped a video midway through: "After this activity I think I stopped the video because I read the little blurb and I knew what was going to happen." Finally, verbalizations produced during the virtual revisit think aloud included clarifications about why the cursor hovered over text and remained motionless. The following quote is from an in-service teacher who explained why she was interested in reading a particular passage of text:

> I was reading the description of each part pretty in-depth and looking at the reading versus the writing, where there were changes and what they looked like. I was interested in the division between language skills versus print or language concepts versus print concepts.

As a result of participants' reasoning, greater insight into their online behaviour was gained. In summary, reasoning included clarification of participants' navigational choices, explanations of the difficulties they encountered and features they abandoned, and rationales for motionless cursors.

**Producing Themes Related to Higher Cognitive Processes**

While Ericson and Simon (1984) stated that higher cognitive processes or Level 3 verbalizations are less reliable because they involve access to long-term memory, usability researchers have found that this type of data provides useful information (Boren, & Ramey, 2000; Guan, Lee, Cuddihy, & Ramey, 2006; Olmsted-Hawala, Murphy, & Hawala, 2010). The themes produced as a result of the virtual revisit protocol analysis can be categorized as higher cognitive processes, that is, cumulative knowledge that is constructed as it relates to each learner's experience (Barak, 2010). The higher cognitive verbalizations that resulted from the participants' think alouds, include analyzing, creative thinking, and reasoning. Participants analyzed information in relation to their current teaching practice, they created plans for their future lessons, and, as discussed in the previous section, they reasoned about their online behaviours.

**Analyzing information.** Many participants analyzed the information as it related to their current or future practice. This cognitive process required participants to activate prior knowledge in relation to what was presented on the website. For instance, one in-service teacher participant examined an activity discussed in a video and linked it to her own practice:

> Here, [the teacher] talks about having a few little trinkets in a zip lock bag for her students on the first day to make them feel comfortable and safe and welcomed in the classroom. That is something that I would consider with a homeroom.

Another in-service teacher participant connected a photograph of student work samples to her students' learning styles:

> Just looking at the visual there was interesting and seeing what they did in the design with area and perimeter. My students really like to do hands on activities, so it kind of also has a component with art.

By connecting information to their practice, knowledge is gained about the teachers' understanding and usefulness of the information on the site in relation to their own experience.

**Creative thinking.** Participants formed concepts and constructed ideas related to their future goals and lesson plans as they viewed the screen recording of their navigation. For instance, participants verbalized how they would use the information presented on the website in their own practice, an important element of professional learning. By sharing their goals we learn about the value of the information presented on the website.

For instance, after viewing a video on how to use a wiki page in the classroom, one practicing teacher states that her students "could create a wiki page and the wiki could be a part of their medieval times project." As another practicing teacher viewed his screen recording, he described how an activity on writing conventions would be a valuable component to incorporate into a near future lesson:

> So she's talking about the conventions and her lesson on conventions and using the kids' names and not putting capitals in. I thought that was a good idea so I listened to a lot of it and I kind of stopped exploring…once I got up to a point with something like this I thought, hey this is something I can do next week.

Finally, a pre-service teacher states how she would like to use word work activities in her future placements: "I wanted to see what [the word work activities were] like with third and fourth grade so that I could use it in my placement next year."

Based on the above themes, the virtual revisit retrospective think aloud appears to be an effective approach for exploring the use of Internet-based resources by elementary teachers. Verbalizations resulting from the virtual revisit think aloud went beyond simple descriptions, allowing participants to reason about their behaviour—participants clarified their navigational choices, explained the difficulties they encountered and why features were abandoned, and provided rationales for motionless cursors. Furthermore, higher cognitive processes, including analyzing, reasoning and creative thinking were produced as a result of the virtual revisit think aloud. In all of the above examples, knowledge is gained about the participants' online behaviour, reasons for their choices, and how the participants value the website content with respect to their current and future teaching practice. This information can benefit educational website designers and policy makers by helping them to understand the reasons behind particular choices teachers make when using online resources. With this understanding, professional online resources can be developed to take web seeking behaviours into consideration.

### What factors motivate teachers to use an online professional development resource?

Verbalizations that resulted from the virtual revisit think aloud produced two major themes concerning the factors that motivate teachers to use an online professional development resource: (1) Evaluating information and presentation; and (2) Contributing information to professional practice. The following sections provide a summary of each of the identified themes concerning the second research question. Direct quotes are included to represent each theme.

### Evaluating Information and Presentation

Evaluation involves the collection, organization and analysis of information. Within an online learning environment, evaluation factors such as trustworthiness, credibility, accessibility as well as web design have a significant influence on users' navigational decisions. In the present study, the virtual revisit methodology allowed participants to evaluate the quality of information, the ease of using and accessing the information and the overall design of the website.

**Quality of information.** Both pre-service and in-service teacher participants commented on the quality of the given website and that the web-based tools and content appeared to have been carefully and thoughtfully chosen. For instance, one in-service teacher participant referred to the trustworthiness of the site and shared details about why the trustworthiness of a website is an important consideration when navigating for professional resources:

> I trust this website. When provided links to something I know that I can rely on them…there are so many links to credible websites…it's nice to know that these have been researched and approved.

Furthermore, references to specific resources or educational affiliations, including the websites' organizer, a non-profit organization that promotes research-based practice, were identified in the think aloud protocols. One pre-service teacher participant remarked: "I love the quotations and I also really, really like the links to other websites. I think it makes the website more credible."

Participants evaluated the information as they verbalized their thoughts while viewing the screen recording of their navigation. They were interested in the trustworthiness of the site and noted how the credible and recognizable links to journal articles and well-known educational resources and organizations had a positive impact on their overall perception of the website.

Access to credible and reliable professional websites ensures accountability and trustworthiness of the information presented on the website. Zaharias (2009) emphasizes that the basis of an online learning environment "should be the quality of content" (p. 47). Content should not only be relevant, but it should also come from reliable and cited sources (Zaharias, 2009).

**Ease of use.** Along with the quality of information, participants made at least one reference to the ease of accessing the presented information. For instance, one participant noted that the speed was an important indicator in choosing to view a video or web-based technology: "I found that when you went from small scale to large scale it zoomed right away, there was no loading time which I found interesting." Navigation throughout the website was also noted by a number of participants as being effective and logical. For instance, upon entering a virtual classroom one pre-service teacher candidate made reference to the ease of using this interactive tool: "I realized you could zoom and scroll around the virtual classroom. I thought that was just really effective and easy to use."

The virtual revisit methodology provided participants with an opportunity to reflect on their navigational decisions. For instance, many participants referred to the logical order of the webpages and noted the importance of highlighting the purpose of the website on the home page. This suggests that upon an initial exploration of a professional website, teachers may be eager to understand the background of the website and what it proposes to offer. Easily accessible search engines within the site were also referred to throughout the participants' explorations.

**Appearance.** Visual design can have a significant impact on whether or not a user will return to a site and includes characteristics such as space provision, choice of color and readability (Zaharias, 2009). The visual design and appearance of the website in the present study were noted by most of the participants as playing an important role in deciding whether to continue exploring the content. Similarly, including a variety of visual technologies appeared to contribute to the appeal of the website. References were also made to the website's use of color, design, graphics and technologies, such as photographs, videos, and virtual tours. For example, one pre-service teacher candidate noted the effectiveness of the visual cues and how they contributed to the website's ease of use: "It's good that you have the image in the thumbnail so you get a little preview of what you're going to see."

### Contributing Information to Professional Practice

The primary goal of any resource is to contribute meaningful information to professional practice. While the content, quality and appearance may influence a teacher's motivation to initially explore a website, frequenting a resource appears to be related to the usefulness of the information it provides. The virtual revisit allowed participants to describe meaningful connections to their teaching practice.

**Usefulness of information.** All participants referred to the utility of the information and described ways to use the website in their practice. Usefulness of information was most often

referred to by all participants, with one in-service teacher referring to the usefulness of information ten times during the 10-minute think aloud. Pre-service teacher candidates primarily focused on how they would use the web-based technologies as certified teachers. For instance, one pre-service teacher candidate noted how the virtual tours would be an effective resource at the beginning of the school year: "I thought the virtual tour was really effective, especially if you are interested in how you want to design your classroom."

Pre-service teacher participants often navigated towards information that would be relevant to their future practicum courses and experiences. For instance, one pre-service participant stated: "Here, I'm looking to see if there are any other interesting videos…and this one appealed to me because I normally work with younger students. I'll be working with grade one students in my placement next year."

These findings suggest that while navigating through a professional website, pre-service teacher candidates consider how the resource will contribute to their knowledge of lessons and classroom activities. Web-based technologies, including virtual classrooms and demonstration videos, can provide pre-service teachers with an additional avenue to explore and gain knowledge about teaching strategies and practices. This is acknowledged by Barnett (2006) who states that pre-service teachers must be provided with "many and varied opportunities to examine authentic teaching classrooms" (p. 724).

Whereas pre-service participants most often made reference to how they would use the website in their future teaching experiences, in-service teacher participants linked information to their current teaching practice. Connecting information to current knowledge and experiences is a component of adult experiential learning and has been discussed in the literature as having positive long-term effects on professional practice (Cercone, 2008). One in-service teacher immediately connected a demonstration video to his current teaching practice: "This is what we've been focusing on, so with the website I'm zoning in to what I'm knee deep in at this particular moment."

Practicing teachers also referred to specific literacy concepts and professional terminology more often than pre-service teachers: "I was interested in looking at the differences between phonemic awareness and letter-sound and phonics and also spelling and word study versus vocabulary."

The idea that practicing teacher participants were interested in seeking out information related to specific literacy concepts, suggests that teachers are motivated to expand their repertoire of content knowledge. By gaining knowledge in content areas through professional online resources, teachers have the potential to improve their teaching practices.

## Implications and Future Directions

The results of this study offer both broader and context-specific contributions to the literature: the more general contribution of the research relates to the virtual revisit methodology, which combines screen capture video technology with the think aloud procedure as a means of generating process-tracing protocols. The context-specific contributions of this study relate to the factors that motivate pre-service and in-service elementary teachers to use a particular free online professional development resource (www.LitDiet.org).

The methodology presented in this study appears to be an effective approach for exploring the use of Internet-based resources by elementary teachers. Participants were able to access their interactive decision making immediately after viewing a recording of their navigational experience. They viewed details of the website and offered reasons for their online behaviours. Specifically, participants clarified their navigational choices, explained the difficulties they encountered and why features were abandoned, and provided rationales for motionless cursors. The virtual revisit allowed participants to focus on what they were doing at a particular time while freeing them from having to complete the task and simultaneously talk about it. Furthermore, the limitations of concurrent and retrospective techniques may have been avoided by having participants review and comment on a visual recording of how they interacted with a particular website. Using the virtual revisit participants accurately recalled their decisions and why they made them.

Findings also reveal factors that motivate elementary teachers to use online resources. Protocol analysis of the think aloud transcripts suggests teachers' motivations to use online resources may be higher when resources are accessible, trustworthy, and well-designed. Moreover, analysis revealed that a teacher's motivation to return to a professional website may be dependent on the usefulness of information provided by the site. Quality research-informed content that incorporates current instructional strategies can provide teachers with critical connections to their current and future teaching practices.

The virtual revisit could be applied to examine the cognitive processes of participants in research involving online learning and website use in other domains in education. However, research is required to determine whether the virtual revisit methodology provides credible and reliable results when compared to the traditional concurrent and retrospective think aloud methods. A comparative study examining the virtual revisit think aloud and the more traditional think aloud methods has the potential to offer insight into the benefits of employing the virtual revisit in future teacher professional development research. Furthermore, a study examining how teacher backgrounds (i.e., age and years of experience, comfort level with technology) affect their thought processes as they think aloud about their decisions while viewing a screen recording of their navigation warrants attention.

Navigating online resources requires the ability to reason, problem-solve, and make decisions, all of which lead to the process of learning and making connections to current knowledge. The use of the virtual revisit as a methodology in the areas of teacher cognition and online learning has the potential to provide greater insight into the reasons why teachers use professional websites and their cognitive processes and strategies while navigating online.

## Conclusion

As elementary teachers increasingly turn to the Internet for their professional learning, it is essential to examine how teachers use professional websites and web-based technologies. This study explored the effectiveness of the virtual revisit think aloud as a method for examining the factors that motivate elementary teachers to use an online professional development website. The findings suggest the virtual revisit think aloud is an effective method for examining the factors that motivate teachers to use online resources and that the limitations of the more traditional approaches may be avoided. Furthermore, gaining direct insights into the motivating factors that influence elementary teachers to use professional websites has the potential to contribute to the

ongoing development of high quality online learning environments. If researchers provide feedback to educational website developers based on the methodology used in the present study, improvements can be made to the design and content of their sites. Similarly, findings may benefit policy makers and administrators of professional development by providing insights concerning factors motivating teachers to use online resources for their professional practice.

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