

**Historical literacy in 21st century Ontario:
Research using **The Virtual Historian****

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Introduction

“Technology,” as an issue of *Education Canada* (2001) – the Canadian Education Association’s leading magazine – states, “has become an accepted fact of life and education.” “Serious discussion of the changes that technology is making to teaching and learning,” the editor goes on, “forces us to revisit some fundamental questions about the goals of schooling and the foundations of learning” (Dunning, p. 1). Indeed, computational technologies have radically altered people’s working and living practices – from video-conferencing to computer gaming to online shopping. As might be expected, technological aficionados foresee similar drastic changes in educational policies, curricula, and practices – and for sound reasons. For example, the Programme for International Student Assessment (PISA) results of 2000 reveal the significant role and impact of computational technology on students’ learning, particularly for western countries such as Canada. Not only is the home penetration rate of such technology for high school students extremely high (88% as of 2000), but statistics indicate a positive correlation between computer and internet access and students’ literacy practices. “PISA results,” Bussi eres and Gluszynski (2002) note in their Canadian evaluation of the study, “showed that there was a positive association between reading scores and home computer access, and this association increased with the number of computers present” (p. 17).

Yet beyond this excitement for technology in education, it is increasingly apparent in school circles that Information and Communications Technology (ICT) in its current form cannot be integrated directly into classrooms without educational transformation. Features of computer hardware and software, as well as digital technologies available to users, rarely match pedagogical demands of students and teachers. Whether it is an online program, a virtual simulation, or an interactive presentation, users must perform multiple, and often complex, adjustments to fit local curriculum requirements. For Bill Tally (2007), senior researcher at the Center for Children and Technology in New York, teachers correctly judge computers “to be too finicky and troublesome to fit in well with the demands of the school workday – in short, not worth the trouble” (p. 310).

Under the circumstances, what are the impacts of ICT on classroom teaching and students’ learning? What educational technology or digital applications can improve learner-centred practices and disciplinary expertise? What evidence do we have that such technologies have a positive effect on schooling?

This chapter addresses some of these fundamental questions from a disciplinary perspective. Using history as a domain of knowledge, it first reviews the research base related to inquiry learning and digital technology in history education. For the purpose of this chapter, “digital technology” refers to computer or network-based applications and resources, including online learning programs, supporting teaching and learning of subject matter. Then, the chapter explores the implications of using technology in the classroom, focusing on the findings from our studies with the Virtual Historian. It then argues for the development of technological pedagogical content knowledge as an additional knowledge base for successful integration of technology in education.

Doing History...with Technology

History educators have long argued for more authentic forms of history teaching and learning. From the 19th century inquiry ideas of Leopold von Ranke through to Fred Morrow Fling’s “source methods,” progressive historians have believed in a theory of school history anchored in teaching the discipline with inquiry. Meaningful and enduring understanding, from this perspective, is an active and continuous process of knowledge acquisition and (re)construction in light of students’ prior knowledge, understanding, and engagement. In history education, several studies (Seixas, 2002; Shemilt, 1987; Wineburg, 2001) have documented the futility of teaching historical knowledge with traditional stories about the past. Instead, they have pointed to the necessity of engaging students actively in the heuristics of reading, sourcing, researching, and doing historical investigations.

Yet, as Wineburg (2001) puts it so eloquently, historical thinking is not a “natural” act (p. 7). It is a sophisticated form of knowledge. Novices intuitively view history as a story of the past whereas historians develop expertise in thinking critically about the past. For the former, learning history is equated to “getting the story right,” usually in the form of a simplified narrative as found in textbooks. For the latter, however, knowing history implies a complex – and always tentative – dialogue with the past using available evidence and tools of the discipline.

Faced with this situation, Wineburg (2001) believes that teachers must engage students in sophisticated thinking. To do so, teachers need (a) deep understanding of their discipline, and (b) successful instructional strategies and pertinent pedagogies that support active learning

and thinking in the classroom. Growing evidence suggests that development of a community of inquiry can help develop expertise among novices (Bain, 2006; Friedman, 2006; Levstik & Barton, 2001; VanSledright, 2002). Levstik and Barton indicate that the process of asking meaningful questions, finding evidence, and drawing conclusions is known as inquiry. Teachers, they argue, “can capitalize on children’s natural enthusiasm for learning by making their classrooms places where students explore important and meaningful questions” (p. 13).

Such inquiry learning strategies in the domain, however, pose significant challenges to educators. For Seixas (1993), the community of inquiry in the classroom does not – and cannot – replicate that of the historian’s. Given age fundamental differences, experience and relation to knowledge and authorities, the classroom community of inquiry is rather a place where “history teachers occupy a key position between two communities organised around history knowledge and learning” (p. 319). Students only form a community of inquiry if they are introduced to inquiries “under the skillful direction of a teacher” (p. 320). Indeed, as studies reveal, the development of expertise in history must be based on sound pedagogy that “value[s] inquiry deeply to undertake the challenges of such demanding practice” (Saye & Brush, 2006a, p. 184).

Potential benefits of building a community of inquiry in the history classroom are many. It provides teachers with experience and understanding of what it means to do history and how students can progress toward more sophisticated thinking. From this perspective, as VanSledright (2004) contends, historians can serve as a “benchmark in relationship to which we can understand what the less sophisticated historical thinkers do” (p. 230). Second, a community of inquiry creates a learning environment more conducive to students’ discovery – a key aspect of constructivist learning. The community of inquiry puts students in charge of their own learning and engages them in authentic performances. Finally, building a community of inquiry necessitates a different learning interaction with the subject-matter. Because students do not intuitively know how to think critically, they must count on the support of teachers. Teachers must model best practices by demonstrating what it is like to inquire, that is, to investigate the past using essential questions, to collect and analyze evidence, and to draw conclusions and make judgements. On the other hand, coaching students implies another key element of inquiry-based learning: scaffolding. Because students need support to progress in the discipline, teachers must provide the necessary learning structure. By breaking down investigative activity into smaller, more manageable

components and by offering scaffolds, it becomes possible for students to engage progressively in meaningful inquiries.

Equally challenging is the use of educational technologies. I have argued elsewhere that rich technological open learning environments, such as digital history programs, can support inquiry-based learning because of the types of materials and opportunities they offer to users (Lévesque, 2006). With the development of the internet and related applications, there has been a push in the last decade to infuse digital technology into the curriculum (Swan & Hofer, 2008). As Saye and Brush (2006a) argue, digital open learning environments (a) create more realistic, vivid engagements with history (life-like inquiries) than what is currently available, and (b) draw on and stimulate student development of expertise in history and new technologies.

While school subjects such as science, language arts, and geography directly benefit from the affordances of instructional technologies, history lags behind (see Cohen & Rosenzweig, 2005; Saye & Brush, 2007). Particularly in Canadian education, few digital programs are geared toward history education beyond archival websites, virtual tours and online texts. The recent development of the *Great Unsolved Mysteries in Canadian History* (<http://www.canadianmysteries.ca>) and the *Cyberterrorism Crisis Web Site* (see Chapter 3 in this book) present refreshing initiatives to Canadian educators (see Sandwell, 2005). In their own unique way, these programs put users in the virtual shoes of detectives engaged in investigating past and contemporary issues of significance.

Students' Learning and the Virtual Historian

Instructional experience and effectiveness of digital technology directly affect student learning. Studies have revealed the limited pedagogical impact of story-telling on students' historical development and reasoning (Voss & Wiley, 2000; Yeager & Doppen, 2001). As they are not exposed to what it means to do history, students typically see themselves as passive receivers whose role is to "get the story right." There is thus a need for a shift in students' existing habits of classroom work. The integration of technology in the history classroom can provide a catalyst for such a change (Ashburn, Baildon, Damico, & McNair, 2006).

Yet, educators must not hold unrealistic expectations. Recent findings in education suggest that technology alone is no panacea (DeWitt, 2007; Friedman, 2006; Tally, 2007). Friedman argues in his study of high school history teachers and technology that the use of online sources “depended to a greater extent on their access to computer projectors and school computing facilities...” (p. 139). In the same way, the experimental studies of Saye and Brush (2004, 2006a, 2006b, 2007) and Britt, Perfetti, Van Dyke, and Gabrys (2000), the qualitative works of Lee and Calandra (2004) and Milson (2002) on WebQuest, and finally the Google study of Pan et al. (2007) offer important recommendations to consider. Affordable access to online resources, such as primary source documents and artifacts, provide users with a rich base of historical information rarely available in textbooks and learning guides. From such sources, students can be exposed to a greater variety of source types (print, audio, video, and artifactual) and perspectives on a given subject, widening their horizons and increasing their understanding of history. Yet, many students in these studies have expressed concerns with regard to the nature of the sources and the amount of sources available. Online texts – digitized historical ones in particular – are rarely produced in a language and genre familiar to students. In the same way, the large amount of information available at the click of the mouse seems to overwhelm students who lack the searching and skimming skills necessary to navigate multiple, and often contradictory, texts. The end result, as Milson (2002) observes, is that many students typically adopt a “path-of-least-resistance,” scanning the material for quick and easy cut-and-paste factual answers (p. 344).

Finally, learning scaffolds provided to students offer interactive cognitive tools meant to support learners as they engage in doing history. These learning supports (e.g., worksheets, heuristic questions, writing templates, definitions, and answers) facilitate inquiry skills, literacy, and historical reasoning. But results suggest that scaffolds are not necessarily used by students who prefer to rely on their intuitive thinking, which leads them to briefly search texts for the “right story,” and not engage in the analytic process of reading historical sources.

Available to users in both French and English, the Virtual Historian (VH) (www.virtualhistorian.ca) is an educational technology developed to meet some of the challenges of digital history learning (see Figure 1). Unlike textbooks, learning guides and WebQuests, the VH provides users with non-linear, authentic, and realistic inquiries (“missions”) about key issues in Canadian history. Web-based inquiries are framed around “topical questions,” which call for critical analysis, dialectical reasoning, and sophisticated

understanding of central phenomena in the history curriculum (Wiggins & McTighe, 2005, p. 113). To complete the inquiries, students are provided with an online tutorial, a brief synopsis of the mission with a topical question to answer, curriculum rubrics presenting all learning objectives addressed in the mission, some conflicting primary and secondary sources on the issue (including high resolution digitized copies of originals that can be manipulated online), embedded reading, sourcing, and writing scaffolds to support thinking and active learning, and a web-based notepad to record and write answers. Students have access to an online glossary, additional web resources (e.g., national archives, museums, and newspapers) as well as to an integrated email program to communicate with the teacher or program administrator.

Figure 1

The Virtual Historian library



Even though the VH was designed to promote inquiry learning, does it really work? Does it have a positive impact on students' sophisticated understanding? To answer these questions, an experimental study was conducted with 107 Ontario high school students in 2006 and 2007. Following the Canadian history curriculum for Grade 10 (Ontario Ministry of Education, 2005), one mission (case) was developed in the VH program: a case on "World War II and the Dieppe Raid, 1942" with four Grade 10 history classes (two instructional and

two VH) from two different English-speaking, urban school boards. By using the VH in Canadian classrooms, the study aimed to uncover the still unclear role and influence of such educational technology on students' historical thinking and literacy – in terms of knowledge acquisition, procedural understanding (e.g., use of evidence, perspective, significance), and epistemological knowledge understanding (how historical knowledge is constructed). Because of its potential, the assumption was that digital history, as built in the VH program, can “mediate and support students' historical thinking” (Bain, 2006, p. 109).

Methodological matters

The methodology for this quasi-experimental research includes three strategic components: the subject matter (tasks), the participants (students), and the analysis (data).

Subject matter:

The subject focus for this study was on Canada's participation in World War II: The Dieppe Raid of 1942. The participation of Canadians at Dieppe in 1942 is an important episode in the study of World War II. It marked the first official engagement of Canadian soldiers on the European front. Of the 6000 troops involved in the raid of August 1942, 5000 were from French and English Canadian units. The Dieppe Raid was not a military success: 907 Canadians were killed in the battle and 2000 were taken prisoner. The outcome and impact of the raid are still debated today: useless massacre or necessary lesson for D-Day?

The Ontario history curriculum for grade 10 puts emphasis on learning about the contested raid of 1942. Under the general learning expectation dealing with “Canada's participation in war, peace, and security,” the curriculum states that “by the end of this course, students will... describe Canada's and Canadians' contributions to the war effort overseas during World War I and World War II” (e.g., Ypres, Vimy Ridge, Passchendaele, Hong Kong, Battle of the Atlantic, Dieppe, Sicily, D-Day, etc.) (Ontario Ministry of Education, 2005, p.47). Ontario approved textbooks for grade 10 reinforce the expectations of the curriculum by providing students with an historical account based on information and powerful images on World War II and the Dieppe Raid of 1942.

The tasks included for this study first comprised a pre-instruction test that identified students' prior knowledge and understanding of World War II and the Dieppe Raid (see Appendix C). This test was administered before students received formal teaching on the

subject by the selected teachers (see next item for participating teachers). It addressed: factual knowledge (e.g., What do you know about the Dieppe Raid? When did it happen? Where did it take place? What were the countries involved? Name troops or regiments who participated in the raid? Who do you think won the raid? Why?); procedural historical knowledge (e.g., Is the Dieppe Raid important to study? For what reason(s)? What were the consequences of the raid?); and finally epistemological knowledge (e.g., What does history mean to you? How do think historians study the past? Is it possible to have different interpretations of the Dieppe Raid? Why?).

The second task focused on the experimental use of the Virtual Historian as a web-based teaching tool (see Appendix E). Selected students (see next item for selection) from the VH groups received a brief introduction to the program by their respective teachers (what is this program? How do I access it? What do I do for the “mission”?) and spent three additional classes on the web-based historical investigations (see Appendix B). During these classes, the teacher’s role was to assist students in their learning of the topic from the Virtual Historian. That is to say, the teacher did not teach formal lessons on the subject but rather provided technical and/or pedagogical assistance to students as they individually investigated the history case from their computer desk. The “case” from Canada’s participation in World War II developed in the Virtual Historian comprises a series of authentic, multiple perspective primary and secondary source documents on the issue: personal diaries, historical maps and photographs, declassified Allied and German newsreels and memoranda, a Canadian newspaper article of the time, sounds and animations, and extra resources in the form of hyperlinks to relevant websites.

Students in the classroom groups (see next item for selection) did not use the VH but learned from one classroom lesson and an inquiry-based activity in the form of a carousel set with classroom resources distributed to them at each station. Teachers in these classes were responsible for designing three lessons on the subject matter and were instructed to use the same primary and secondary sources on Dieppe. These included primary sources (historical photographs, paintings, and maps) and secondary sources (excerpts from three textbooks, video clips from CBC *Canada: A People’s History* and *Canada at War* Series, and the Canadian Encyclopedia online) that students analyzed during the activity. The lessons were submitted and reviewed before teachers engaged in the study of Dieppe with their students. In agreement with the schools and teachers, a member of the research team conducted

observations during these classroom lessons to monitor the learning experience in each classroom. Both the VH and classroom groups had to answer the same questions on the Dieppe Raid (that is, the “mission”) and provided with the same report template (see Appendix E). More specifically, the history case (“mission”) asked students to study the strategic importance (or “historical significance” in historians’ language) of the Dieppe Raid for Canada, the Allies, and ultimately for World War II. Students in all groups wrote an historical report on the raid of 1942 based upon the worksheets and sources provided to them – either in the virtual library or in print copies.

Finally, the same questions from the pre-instruction test were used in a post-instruction test to assess students’ progression in historical learning of the subject (see Appendix D). Short open-ended questions were also included in the post-instruction test concerning their learning experience (VH or classroom) and their awareness of what had been learned, that is, their metacognitive competence.

Participants:

The participants for this study were made up of four classes of grade 10 students from two urban Ontario school districts (n = 107). The reasons to select these two districts were many. First, both schools officially cover the Dieppe Raid as part of the compulsory grade 10 Canadian history program under the expectation “Canada’s Participation in War, Peace, and Security” (Ontario Ministry of Education, 2005). Second, both districts place explicit emphasis on inquiry-based learning and historical literacy and were supportive of this research as well as of the use of the Virtual Historian as a web-based learning tool for the unit on World War II. Third, the principal investigator has, over the years, developed strong connections with the teachers and coordinators from these two districts. As a result, applications for ethical reviews in each respective district as well as access to schools and students were easier and more cost-effective than with other boards in the province.

The selection of participants followed a multiple-case design (Yin, 1994). Two large urban schools in Ontario provided windows into two comparable grade 10 classes per district.

The demographic information for the participating schools indicates that 787 students were enrolled in school #1 (174 students in grade 10), and 887 students in school #2 (170 students in grade 10). Results of the Ontario grade 10 literacy test for the schools indicate that 92

percent of participating first-time eligible students successfully completed the Ontario secondary school literacy test for school #1 and 64 percent of participating first-time eligible students for school #2 (compared to 84 percent for the province). Each school had one classroom and one VH group with similar achievement means and variance. As “true” experimental designs are extremely difficult to undertake in educational research (due to access, consent, and control of variables), this study followed the model of a quasi-experimental design (Cohen, Manion, & Morrison, 2000). This is to say, then, that the selected grade 10 classes from the two districts were not exposed to randomization as the schools and classrooms were selected on their willingness to participate, their typicality, and achievement so far in the course (i.e., represent particular characteristics such as students’ background and achievement, exposure to web-based technology, teachers’ interest in infusing technology in class). Two different teachers (one for the VH group and one for the classroom group) were selected for each school. Selection was based on willingness to participate in the study. As the attribution of classroom and VH groups was decided by the research team, teachers did not have the opportunity to decide what group they belonged to. All the selected teachers met with the research team to discuss the research, procedures, and implications for their classroom teaching. Normal procedures for obtaining informed consent for working with teachers and students in schools were followed (see Appendices A and B).

Analysis:

Data collected from the two groups (i.e., pre-instruction test, historical report, and post-instruction test) were analyzed and rated independently by two judges (PI, RA). Teachers also evaluated the performance of their students in writing the history report for their own formative assessment.

More specifically, the focus of the analysis was placed on four aspects of historical thinking and literacy: historical knowledge acquisition (factual knowledge), procedural knowledge understanding (use of evidence, historical perspective, significance, and judgement), epistemological knowledge (knowledge of criteria and processes to construct history), and historical literacy (ability to make sense of and use history language, images, and texts in the writing of historical explanations). For each task (pre-instruction test, history report, post-instruction test) a rubric taking into account the questions asked and the aspects of historical thinking and literacy was designed to evaluate students’ responses (see Appendix F). The rubrics were discussed and presented to all members, and used in the evaluation of students’

historical performance. Data from the students were transcribed, coded, and analyzed using qualitative and quantitative data analysis software (Atlas.ti, SPSS). The qualitative aspect of the analysis focused on the value and meaning of students' responses to each question (pre- and post-instruction tests) and the writing of the essay, and served to illustrate and enrich the findings from the study. The quantitative aspect allowed for an analysis of variance and for consideration of the impact of the independent variable (use of the VH) on students' historical learning in Canadian history.

Findings

Table 1 presents data on the VH and comparison groups concerning their understanding of subject matter, discipline, and epistemology for the history case (World War II and the Dieppe Raid). For both instructional and VH groups, pre-test, post-test, and essay scores show that students increased their comprehension of the subject matter, understanding of history, and literacy skills (ability to write an argumentative essay).

However, findings reveal that using the VH led to the organization and writing of more sophisticated essays as evidenced by students' mean scores ($m=15.93$ vs. $m=12.26$ for school #1). A t-test reveals a statistically reliable difference between the mean scores of the two groups for school #1, $t(44) = 3.570$, $p = .001$, $\alpha = .05$. Students in the VH group were able to construct more structured and coherent arguments than their counterparts. Their knowledge of the subject (e.g., series of events, actors, facts) was greater and their ability to think historically (present clear arguments supported by appropriate evidence, consider historical significance, and make judgement on the issue) was significantly more sophisticated than those in the classroom group. The same pattern could not be found with school #2 ($m=12.73$ vs. $m=12.55$), $t(45) = .172$, $p = .865$, $\alpha = .05$. Yet, when looking at students' understanding of epistemology, findings indicate that participants in the VH group for school #2 developed more advanced understanding of the nature of historical knowledge than their counterparts in the classroom ($m = 4.38$ vs. $m=2.99$), $t(50) = 3.049$, $p = .004$, $\alpha = .05$. Students in the VH group also developed more advanced epistemological awareness of historical knowledge production (how history is studied and presented).

To investigate the relationship between variables (boards, groups, instructional strategies), an analysis of variance (ANOVA) was conducted using the essay scores as the dependant variable and the strategies (instructional, VH) and groups (board #1, board #2) as factors. The

results (table 2) confirm the main effect of the strategy and school board on essay scores. The results also indicate an effect between the instructional strategy and the school board.

Table 1

Mean scores and standard deviations for each variable by group

<i>Variables</i>	<i>Instructional Groups</i>			<i>Virtual Historian Groups</i>		
	<i>Pre-test mean (SD)</i>	<i>Post-test mean (SD)</i>	<i>Essay mean (SD)</i>	<i>Pre-test mean (SD)</i>	<i>Post-test mean (SD)</i>	<i>Essay mean (SD)</i>
<i>Tests and essay School board #1 (WWII – Dieppe)</i>	3.51 (1.17)	10.29 (2.65)	12.26 (3.69)	3.94 (1.78)	11.51 (2.60)	15.93 (2.89)
<i>Epistemology School board #1 (WWII – Dieppe)</i>		3.53 (1.38)			4.23 (1.59)	
<i>Tests and essay School board #2 (WWII – Dieppe)</i>	4.11 (2.67)	9.08 (2.60)	12.55 (2.58)	3.72 (2.76)	10.57 (2.45)	12.73 (4.03)
<i>Epistemology School board #2 (WWII – Dieppe)</i>		2.99 (1.71)			4.38 (1.58)	

Table 2

ANOVA Test

Dependant Variable: Essay scores

<i>Source</i>	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
<i>Corrected model</i>	173.02	3	57.67	4.81	.004

<i>Intercept</i>	15920.08	1	15920.08	1327.17	.000
<i>Strategy</i>	82.57	1	82.57	6.88	.010
<i>Boards</i>	46.97	1	46.97	3.92	.051
<i>Strategy * Boards</i>	67.89	1	67.89	5.66	.019
<i>Error</i>	1067.59	89	11.99		
<i>Total</i>	17376.38	93			
<i>Corrected Total</i>	1240.62	92			

The non-statistically reliable differences on essay scores with students in school #2 are intriguing. Although further analysis is needed at this point, it can be hypothesized from the ANOVA test that external factors related to the school influenced the performance of these students. The lower scores of students from this population in the grade 10 literacy test and the greater number of students with individualized educational programs (IEPs) and also having English as a second or additional language (26% of the grade 10 population for school #2 compared to 10% for school #1) are factors that could have impacted significantly on their overall performance in the study. A section will address this point later in the discussion.

Discussion

There has been a tendency in computational technology literature to blend critical research with self-advocacy. Supporters of new technologies in education tend to see the positive impact in the market place as an indicator of their uncontested potential for classroom improvement. These people, as Swan and Hofer (2008) argue, “appear to assume that technology is preferable to traditional modes of instruction, that it can make a good teacher better, and that it leads to more student-centered (and therefore preferable) instruction” (p. 321). Findings from the VH study suggest a positive impact of the program on student achievement. As one experimental group student puts it, “It’s way better than reading from a textbook or other websites you can’t be sure of.” Another student goes further by arguing that “instead of being taught the topic, we learned it without [teacher] support, which I think helped me more in overall knowledge.”

In light of students’ appreciation and performance, particularly with school #1, one could advocate for a greater place for such digital technology in the classroom. Yet, the educational community will be better served in the end if researchers look at how specific educational technologies affect students and how digital programs such as the VH support or detract from particular kinds of learning and achievement. Instead of presenting narrowly defined case

studies of best practices or new technology implementation, it may be worth analyzing both the potentials and challenges of integrating educational technology in history education. As a matter of fact, the studies with the VH – as well as with other digital programs – present challenges that are critical for further use in the classroom.

Indeed, while most students who exclusively used the VH program increased their overall understanding of history significantly, the great majority continued to look at historical sources from a “readerly” perspective (Wineburg, 2001, p. 69). Texts – whether they are print, visual, audiovisual, or artifactual – are examined exclusively for their conventional, straightforward messages, not for the subtexts and contextualized meaning they convey. Primary sources are comparable to textbooks in that they contain answers (“facts”) that must be discovered. They fail to understand the constructed nature of texts and the purpose and perspective of the authors. More problematic, they attribute greater importance and reliability to simplified secondary sources, such as textbooks, because they convey intelligible conventional truths. As one student confesses, “in class reading a textbook is better because it’s very hard to find accurate info on the computer.”

Equally challenging from the study are the remarks of students, even among those who performed well in the computer lab, concerning their strong desire to interact with their history teachers when learning about complex subjects of the past such as World War II. Over 60 percent of students in our study reported in the post-test preferring either classroom teaching or a combination of teacher-computer to the VH program alone. Reasons given range from the familiarity with the teacher’s style, the unchallenging nature of classroom lectures, the difficulty in analyzing multiple texts (even with scaffolds), deep confidence in simplified textbook stories, and finally classroom interactions with the teacher, students, and learning objects. For this student, “I personally prefer learning Canadian history in class because we go through it and you don’t need to look for your own information.” For another student, “it’s better in the lab, because it’s more fun; however, it is distracting.”

The experimental study with the VH was designed to assess the value of a digital history program on students’ performance. The role of the teacher was therefore restricted significantly in the computer lab so as to limit – and ultimately control – this variable. In reality, however, classroom teachers have a greater role to play in the design, implementation, and delivery of lessons – whether they rely on educational technology or

not. “It is important to remember,” Bain (2006) cautiously observes, “that computer scaffolding does not substitute for instruction, but rather supports students in developing disciplinary habits after they have had at least initial instruction in each procedure” (p. 113).

To be sure, expertise in teaching a discipline, whether history or science, depends on access to and use of complex systems of knowledge. Shulman (1986) established that disciplinary knowledge and pedagogy were necessary but not sufficient conditions to render a subject intelligible to students. Pedagogical content knowledge, he argued, is of special interest to teachers because “it represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction” (Shulman, p. 8). While Shulman’s pedagogical ideas still hold true today, the rapid development and application of educational technologies in the classroom necessitates a review of his teaching model.

Indeed, not all teachers embrace technology – for a variety of personal and professional reasons – but the growing presence of technology in education is uncontested. As such, it becomes imperative to revisit the relation between content, pedagogy, and technology. Too often, knowledge of technology in education is considered in a vacuum, disconnected from disciplinary knowledge and pedagogy, as if an understanding of how technological affordances work translates into sound practice. Students’ and teachers’ familiarity with technology does not automatically turn them into disciplinary experts. For Mishra and Koehler (2006), there is thus a need to develop “technological pedagogical content knowledge” (TPCK) as a basis for teaching with all three forms of knowledge (see Figure 2). This kind of knowledge, they argue:

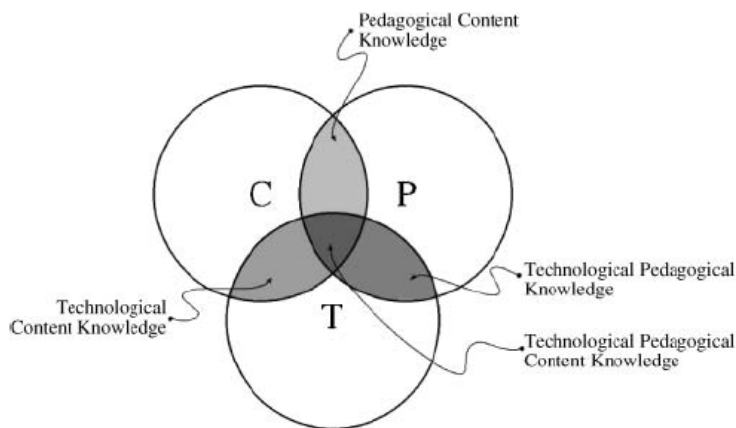
is the basis of good teaching with technology and requires an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students’ prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge and to develop new epistemologies or strengthen old ones. (p. 1029)

Results from our study confirm that building a community of inquiry in the 21st century classroom cannot be accomplished with educational technology alone. Even if teachers and students possess, to varying degrees, technology knowledge about software and hardware, they must be attentive to how learning in the discipline might be improved by “complex relationships between technology, content, and pedagogy, and [by] using this understanding to develop appropriate, context-specific strategies and representations” (Mishra & Koehler, 2006, p. 1029). In other words, using technology in educational design cannot be understood simply as an add-on component to established course work. It must lead to a fundamental reconsideration of disciplinary content knowledge and pedagogy so as to develop a coherent educational framework that recognizes how teaching and learning can be changed as a result of technological affordances.

Figure 2

Technological Pedagogical Content Knowledge Framework

(from Mishra & Koehler, 2006)



In history education, such understanding can take the form of technology-designed-based lessons and units structured around active learning and doing of digital history that transcends traditional roles of “transmitter” and “receiver.” By having technological affordances directly in the classroom, both students and teachers can partake in learning activities that ultimately change the nature of learning due to the pedagogical tools at their disposal. Perhaps more importantly, teaching through this approach allows for classroom-situated learning with technology, that is, a nuanced understanding of how specific educational technology applies, or not, to particular classrooms and teachers. In the case of the VH, for example, a

technology-designed-based activity on the Dieppe Raid could involve a combination of teacher- and student-centred lessons on historical inquiry. Using such tools as a SMART board and the VH program, the teacher could explicitly teach students how to search and read historical documents using a set of heuristics embedded in the program. Having mastered the intellectual process of historical reading, students can then be put into small groups to engage in additional sourcing with material provided by the Virtual library. As a culminating task, they could – individually or in groups – use the VH program to create their own historical interpretations. The role of the teacher would inevitably shift from “lecturer” to “coach” (Gaffield, 2002), providing support as students employ disciplinary thinking tools to read, analyze, compare, and develop meaning from the sources.

This pedagogical shift in approaching technology in history appears to be even more necessary with students who have learning and/or language difficulties. Although most grade 10 students in this study reported having high computer literacy skills, many struggled to engage actively with the various functionalities of the VH program. This was particularly apparent with students from school #2, which has a very large number of students with learning difficulties (as identified in literacy test scores and the number of IEPs) and immigrant students for whom English is an additional language. For example, the dynamic map of the landing area and the embedded primary source photographs were repeatedly characterized as “cool” but rarely used as historical evidence in their essays. Students, whether they looked at visual or print texts, often seemed overwhelmed by the amount of information contained in the sources and the historical language employed by the authors of the time. In either case, students had problems understanding that sources, whether they are primary or secondary, must be questioned and analyzed critically in order to be used as historical evidence even with the online scaffolds provided in the program. Too often, the answers in the tests and the arguments presented in the essays reveal a limited ability to read beyond factual knowledge. Sources continue to be regarded as “pictures of the past,” that is, as direct access to the truth (see Dickinson, Gard, and Lee, 1980, p. 15).

Mark, a history teacher with school board #2, reflects on how best to use technology with his grade 10 students in these circumstances:

Our students have never been exposed to such a large collection of primary source materials; it is the richness of the materials that created both the most positive responses (‘Cool!, ‘Hey have you seen this picture?!’, ‘I can’t believe they did that’)

and the most negative ('There's too much to read and it all sounds the same to me', 'What is the point of all these pictures?', 'What are we supposed to be *doing*?!')... I would have liked to be able to use the VH for a less challenging question or a more concrete and directed activity.

Technology in education is inevitable. Yet no single technology can apply universally to teachers. Teaching, as Shulman (1986) established, is a complex activity that cannot be reduced to a set of pedagogical steps that invariably produce positive outcomes. Teachers must be flexible in their use of knowledge to design successful lessons adapted to their audience with the most effective learning tools at their disposal. Digital history programs, such as the Virtual Historian, provide an additional technology to achieve inquiry-based learning in history.

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Appendix B

Informed Consent Form

**Historical Literacy in 21st century Ontario:
An experimental research using the Virtual Historian**

I have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

I consent to participate in this study.

Student (please print)

Signature:

Date:

I consent to my child's participation in this study.

Parent (please print)

Signature:

Date:

Appendix C

Name: _____

Class: _____

**Historical Literacy in 21st century Ontario:
An experimental research using the Virtual Historian**

Questionnaire #1 (Pre-test)

Prior understanding

1. When (date) did the Dieppe Raid take place?

2. Where (location) did it take place?

3. What were the countries and forces involved in the Dieppe raid? (e.g., what countries, armies, regiments, or troops)

4. What was the immediate result of the Dieppe raid?

5. What were the consequences of the Dieppe raid for Canada?

6. Why did Canada participate in the Dieppe raid?

7. Is the Dieppe raid important to study in Canadian history? Why?

Subject interest

8. What do you want to know about the Dieppe raid?

9. What do you think you will learn about the Dieppe raid in this course?

10. How interested are you in learning about the Dieppe raid in class?

What history means to me

11. What does "history" mean to you?

12. How do you think historians study the past?

13. Can different interpretations (accounts) of the Dieppe raid be valid or “true”?
Why?

Thank you for your participation.

Appendix D

Name: _____

Class: _____

**Historical Literacy in 21st century Ontario:
An experimental research using the Virtual Historian**

Questionnaire #2 (Post-test)

Prior understanding

1. When (date) did the Dieppe Raid take place?

2. Where (location) did it take place?

3. What were the countries and forces involved in the Dieppe raid? (e.g., what countries, armies, regiments, or troops)

4. What was the immediate result of the Dieppe raid?

5. What were the consequences of the Dieppe raid for Canada?

6. Why did Canada participate in the Dieppe raid?

7. Is the Dieppe raid important to study in Canadian history? Why?

Subject interest

8. Have you learned what you expected to learn about the Dieppe raid during this activity?

9. Have your ideas about the Dieppe raid changed with the study of the topic? If so, in what ways?

10. Has your interest in history increased or decreased with this activity? In what ways?

11. Do you prefer learning Canadian history the way you did (in class or in computer lab)? Why?

What history means to me

12. What does "history" mean to you?

13. How do you think historians study the past?

14. Can different interpretations (accounts) of the Dieppe raid be valid or “true”?
Why?

Thank you for your participation.

Appendix E

Name: _____

Class: _____

**Historical Literacy in 21st century Ontario:
An experimental research using the Virtual Historian**

Performance assessment (essay)

World War II and the 1942 Dieppe Raid:
Useless slaughter or necessary lesson for D-Day?

In early 1942, the situation of Allied Forces looked far from bright. The United States had just been attacked in Pearl Harbour, the German army was forcefully engaged on the eastern front in Russia, British troops in Africa were forced back to Egypt, while Allied forces in Western Europe operated essentially from Britain. Europe was practically a “Nazi-occupied Fortress.” As part of a plan to give high priority to Europe, it was decided by the British and Allied authorities to mount a major raid on the French port of Dieppe, across the English Channel. Canadian troops stationed in England were seen as best suited for this mission planned for July 1942 – called “Operation Rutter.” Because of weather conditions and also some doubts about its real success among British generals, the mission was cancelled. Despite the debate, the mission was revived and given the code name “Operation Jubilee.” The port of Dieppe remained the objective and the raid was set for August 1942.

On the morning of August 19, 1942, over 6000 troops, including nearly 5000 Canadians, 1000 British Commandos and 50 American Rangers, took part in the Raid of Dieppe. The forces, supported by the RAF/RCAF and Navy ships, attacked at different points on the French beaches (blue, red, white, and green). By noon, the raid was over. More than 3000 soldiers, including over 2700 Canadians from regiments such as Les Fusiliers Mont-Royal, the Calgary Regiment and the Royal Regiment of Canada, were killed or made prisoners.

To this day, the success and strategic importance of the raid remain contested: Useless slaughter or necessary lesson for D-Day landing?

Question

Following World War II, the town of Dieppe commemorated the raid of 1942 by creating a special memorial. On a plaque mounted on a stone wall, it is stated:

*On the 19th of August 1942
on the beaches of Dieppe
our Canadian cousins
marked with their blood
the road to our final liberation
foretelling thus their victorious return
on September 1, 1944.
(translation)*

Based upon the evidence provided to you, what was the strategic importance of the raid of Dieppe of August 19, 1942?

Mission

Investigate the raid of Dieppe, 1942 based on the various historical sources provided to you. Write a report in which you analyze and assess the strategic importance of the raid for Canada, the Allied forces, and ultimately for World War II.

(see Teacher's Rubrics for specific expectations)

Appendix F

CODING SYSTEM (PRE/POST TESTS)

FACTUAL KNOWLEDGE

Q 1: 0 (no/wrong answer)		1 (1942 or Aug 1. 1942)
Q2: 0 (no/wrong answer)	.5 (Europe/Dieppe)	1 (Dieppe, France/Europe)
Q3: 0 (no/wrong answer) German or	.5 per correct name for max of 2 pts (Can, British, US, units: FMR, Royal Regiment, Calgary R,US Rangers, RCAF...)	
Q4: 0 (no/wrong answer) (strategy)		1 Can./joint Military failure
Dieppe		Failed amphibious attack on
prisoners		Withdrawal of troops by 1:00pm 2700 solders killed/taken
TOTAL	/5	

COMPREHENSION

Q5: 0 (no/wrong answer)	1.0 demoralized troops and prisoners 1.0 Feeling of tactical failure at home 1.0 Sense of “massacre of Canadians” for British war
objective	1.0 Division between French and English Canadians
over mission	MAX of 2 pts
Q6: 0 (no/wrong answer)	2.0 Canadian contribution to British high command (Allied) 2.0 Need to engage Canadian troops on European front 2.0 Strategic attack to support Russians and divert German effort 2.0 Joint military attack to test German European defense system HOLISTIC EVALUATION MAX of 2 PTS
Q7: 0 (no/wrong answer)	2.0 help understand Canadian contribution to Allied/British 2.0 help understand importance of British command/control 2.0 help explain subsequent events (e.g. Normandy 1944) 2.0 first-time involvement of Canadian troops on Europ. continent

2.0 High number of casualties for Canada
2.0 Provide hard lessons for future amphibious attacks
HOLISTIC EVALUATION MAX of 2 PTS

TOTAL /6

METACOGNITION (POST TEST ONLY)

Q8: 0 (not learned what expected)		1.0 Yes, learned what expected
Q9: 0 (not changed)		1.0 Yes, changed
Q10: 0 (decreased)	.5 (same)	1.0 Increased
Q11: 0 (no VH Group)		1.0 yes (VH group)
0 (yes to classroom)		1.0 no (classroom)

EPISTEMOLOGICAL (Pre- and Post-test)

Q12: 0 (no answer)	1.0 History is study “what happened” (only observable by people then, “facts”), one “true” story of what happened. Historian just tells the story. History is remembering the story.
	2.0 History is study of past from authorities, history changes according to authorities (textbook, teacher, historian) and their “bias”. History is always biased. All sources are the same (true or biased.)
	3.0 History is critical study of past using evidence; provides some contemporary answers to question about past. No single truth, no “test” to find out/repeat experiment. Sources are evaluated critically (some more important/reliable than others)
Q13: 0 (no answer)	1.0 By rescuing the story of “what happened” using observable facts (witnesses). We have direct access to the past. There is a “true” story. Authorities tell the story.

2.0 By using books and authorities in the field. No direct access to past is possible. Multiple stories from authorities due to their biases. Sources are all the same (tell facts or lies)

3.0 By researching, selecting, analyzing all sources (primary, secondary) available and then create stories based on their topic, questions, evaluation of what sources mean, etc. Sources are not just facts or lies but need to be selected and analyzed

Q14 0 (no answer/not possible)

1.0 Difference occurs because of different witnesses (or facts), gaps or bias (some witnesses don't tell the "truth"). Historian may not "remember" the true story.

2.0 Difference occurs because of different authorities (authors), not just a problem of witness / facts, but opinions of authors who create stories. No consideration on reliability of sources, simply matter of personal opinions on the past.

3.0 Difference occurs because of how we access, select, study the past and sources, past is always reconstructed, multiple questions and perspectives are available, accounts always partial. Sources analyzed critically, some more important than others.

TOTAL /9

CODING SYSTEM (ESSAY)

REVISED (9 Jan 2008)

STRUCTURE

Thesis : (focus)

Dieppe

Dieppe

Dieppe

Composition:

- 0. Essay does not present thesis statement on importance of
- 1.0 Essay presents vague thesis statement on the importance of
- 2.0 Essay presents clear thesis statement on the importance of

- 0.0 Essay presents no clear development paragraph/arguments supporting the thesis statement
- 1.0 Essay presents limited 1-2 development paragraphs/arguments supporting the thesis statement
- 2.0 Essay presents at least 3 defined development paragraphs/arguments supporting the thesis statement

Citations/References:

- 0.0 Essay does not include clear text citations (references) and bibliography
- 1.0 Essay includes some text citations (references) and bibliography (but unclear reference system or source information in text)
- 2.0 Essay includes all text citations (clear source references) and bibliography

TOTAL /6

CONTENT LITERACY

Factual information:

- 0.0 Essay does not present clear historical information on raid (when, where, what happened)
- 1.0 Essay lacks information / contains some inaccuracies (when, where, what happened)
- 2.0 Essay presents clear information / no major inaccuracy (when, where, what happened)

Historical actors:

- 0.0 Essay presents no or only 1-2 actors/group in the raid (Germans, Canadians, British, FMR, Royal Regiment, Calgary R, PSM Dumais, Capt Browne, Gen Crerar)
- 1.0 Essay presents some (3-4) actors/groups (Germans, Canadians, British, FMR, Royal Regiment, Calgary R, PSM Dumais, Capt Browne, Gen Crerar, etc.)
- 2.0 Essay presents many key actors (over 4) (Germans, Canadians, British, FMR, Royal Regiment, Calgary R, PSM Dumais, Capt Browne, Gen Crerar.)

Literacy (concepts):
dealing

- 0.0 Essay does not present or define key concepts / vocabulary

How students use amphibious attack) content knowledge dealing

- with the importance of Dieppe (eg, what *raid* is,
- 1.0 Essay presents or defines some key concepts / vocabulary with the importance of Dieppe (1 – 2 concepts, key terms)
 - 2.0 Essay presents or defines key concepts / vocabulary dealing with the importance of Dieppe (3 + concepts, key terms)

TOTAL /6

THINKING

Argumentation:

sources

sources

- 0.0 No clear argument / Arguments not supported by appropriate sources (presented in class, found, or from VH library)
- 1.0 Arguments vague or not always supported by appropriate sources
- 2.0 Clear arguments always supported by appropriate historical sources

Number of sources: make

- 0.0 No historical source (primary and/or secondary) used to argumentation
- 1.0 Only a few sources (1–2) used to make argumentation
- 2.0 Use many different sources (3 +) to make argumentation

Use of sources: Present only

- 0.0 Does not use historical sources to make argumentation. personal statements and opinions (like a “textbook”)
- 1.0 Use sources as “facts” (true), no questioning of the sources (primary/secondary, who, when, where, perspective of author)
- 2.0 Use sources as “evidence” (consider primary/secondary, who, when, where, perspective)

Historical significance*:

- 0.0 Sees the importance of Dieppe only from a single point of view (no importance of Dieppe criteria used). Their position is the ONLY possible. Inconceivable to think differently (now and then)
- 1.0 Sees their personal position in terms of personal “opinions” (all positions are equal). No clear criteria are used to make decision
- 2.0 Sees their personal position as a possible interpretation considering sources, context, analysis, and criteria (possible to think differently)

*Criteria of significance:
(students may refer indirectly

durability (of raid, planning, lasting impact today, etc.)
quantity (casualties, #soldiers in action, POWs, etc.)

to these in their essay)
Day, etc.)

importance for the time (why raid needed in 1942)
consequence (impact of Dieppe for WWII planning, D-

TOTAL /8

GRAND TOTAL: /20