"Keeping up" through Teaching and Learning Media Software: "Introducing" Photoshop

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ABSTRACT *Research on cultural industries suggests that the constant and rapid change to digital technologies used by creative practitioners requires that they continually upgrade their skills in order to remain relevant in their occupations. In this article, we present the results of an investigation into the mediation of Photoshop, focusing on how this digital imaging application software and its content are used to mediate access to cultural work. Teaching and learning Photoshop is presented as a key set of practices for digitally mediated cultural work, raising interesting paradoxes concerning Photoshop's status as a digital imaging standard and how it is used by practitioners to negotiate access to occupations. The findings are drawn from two phases of an ongoing research project that includes interviews with practitioners in Canada and the United Kingdom and participant observation in a Greater Vancouver higher education institution.*

KEYWORDS *Digital media; Cultural industries; Photoshop; Higher education; Application software; Mediation; Communities of Practice*

RÉSUMÉ *Les transformations technologiques constantes et rapides des médias numériques utilisées parmi les praticiens des industries culturelles exigent une mise à jour continuelle de compétences. Nous présentons ici les résultats d'une étude de la médiation de Photoshop, particulièrement en ce qui a trait à l'utilisation de cette application pour l'imagerie numérique et son contenu pour la médiation de l'accès aux occupations de praticiens établis. Nous soutenons que l'enseignement et l'apprentissage de cette application font partis constituants du travail dans les domaines de la culture. Les donnés présentés ci-dessous sont tirés de deux phases d'un projet de recherche : une phase d'entrevues avec praticiens Canadiens et Britanniques, et une phase d'observation participante dans un établissement d'enseignement dans la région de Vancouver.*

MOTS CLÉS *Médias numériques; Industries culturelles; Photoshop; Enseignement supérieur; Logiciel d'application; Médiation; Communautés de pratique*

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Introduction: Critical perspectives on "keeping up" for cultural work

Conceptualizing the relationship between digital technologies and cultural work is of vital importance for investigating the kinds of power relations that enable and constrain how individual cultural practitioners produce and circulate meaning in contemporary culture. Critical approaches to the study of cultural production have considered how keeping up with technological change constitutes a lifelong aspect of the individualized, entrepreneurial, and precarious careers of practitioners in contemporary cultural industries (CI) (Deuze, 2007; McRobbie, 2004).

Mark Deuze's (2007) framework for studying media practices, for example, draws from a production of culture tradition inspired by Richard Peterson in which technologies constitute one of the aspects that shape CI, allowing for cross-comparisons between industries, such as videogames and film. He identifies a pattern of continuous and rapid technological change that is consistent with much critical research in this field. Deuze paints a picture of these technological transformations as part of a digital convergence across industries that cause creative processes to speed up. Other CI scholars caution that too much focus on technological innovation in CI can lead to technological reductionism, and that we must instead understand technology as the "effects of choices, decisions, contingencies, and coincidences in the realms of economics, politics and culture" (Hesmondhalgh, 2007, p. 97). But even in this latter CI model, technological change is conceived as a factor external to cultural production and consumption (Hesmondhalgh).

Nalini Kotamraju's (2002) research into Web design as an occupational skill-set leads her to describe one of its key practices as "keeping up": that is, dealing with continuous technological change by refreshing one's knowledge of the latest relevant technological developments, for the most part through one's own initiative.

> Whether web design skills are presented as conceptual or as straightforward technical competence, the fact remains that they need to be continually updated and reformatted to meet the requirements of the technology. (p. 17)

For Kotamraju, the importance of keeping up as an essential component of Web design confirms some scholars' fears that "a future of constant re-skilling" (Kotamraju, p. 19) awaits these practitioners. These findings are supported by studies of individual digital media workers who perceive the need to keep up as "oppressive" (Gill, 2007, p. 23) and part of digital media work's "always on culture" (Kennedy, 2012, p. 75). Even in the case of research on the highly technically sophisticated industry of videogames, keeping up is understood as something that is internalized as part of cultural subjectivities within the industry (Ashton, 2011b; Dovey & Kennedy, 2007).

These critical approaches to cultural work present the relationship between digital technologies and the practitioners who use them as part of a circuit of production and consumption of cultural content in which digital technologies to varying degrees enable and constrain how practitioners can produce, distribute, and consume content. But "keeping up" with the pace of technological change is more than a one-way relationship whereby industries or individual practitioners are subjected to pressure from an outside force. These approaches risk reinforcing a "habit of description"

(Sterne, 2007, p. 3) whereby researchers look to theoretical definitions of how technology fits in CI instead of how they are actually incorporated into practice by people "on the ground." Digital technology for cultural work is not limited to the status of a tool for producing and distributing CI content. As Lesage (in press) has shown, digital technologies for cultural work circulate through sites of mediation beyond the boundaries of CI workflows. To avoid downplaying the significance of technological change or conflating all digital technologies and their transformations into one homogenous external source of pressure, we must acknowledge the contingent meanings of technology and the varying sites for their mediation. Designing and using technologies for cultural work extend beyond considerations of content production and into sites of meaning-making, which include, as we intend to show, *teaching and learning how to use technologies as part of cultural work*. In order to achieve a conceptualization of digital technologies and technological change that considers these aspects and helps to identify the imbalances of power in dealing with digital technologies for cultural work, we draw from research traditions that address the complex meaning-making processes involved in incorporating media technologies and their content into everyday practice.

Mediation and the cultural biography of media software
In this article, we set out to investigate the mediation of Adobe Photoshop to gain a more nuanced understanding of keeping up with digital technologies for cultural work. We use the term mediation here to describe:

> the fundamentally, but unevenly, dialectical process in which institutionalized media of communication (the press, broadcast radio and television, and increasingly the world wide web), are involved in the general circulation of symbols in social life. (Silverstone, 2002, p. 762)

Although the above definition does not explicitly include application software, this type of software is an integral part of our everyday "media life" (Deuze, 2011). Lev Manovich (2013) categorises Photoshop as "media software," that is, "software for creating, editing, and organizing media content" (p. 24). Building on this definition, we argue that media software and the practices related to its design and use constitute part of these institutionalized media of communication. Media software, as a technological "genre" (Silverstone & Haddon, 1996, p. 59), is more than just a tool; it is also a medium through which people create and engage with cultural content. The relationship between media software and the practices of cultural work are therefore conceptualized as dialectical (Silverstone, 2002). On the one hand, media software represents a structured "space of media" (Couldry, 2008, p. 381) that contains and limits "in durable ways" how certain actors intervene in circulating flows of meaning making; technological designs and marketing attempt to configure, or capture (Silverstone & Haddon, 1996), users. On the other hand, people shape media software's meaning by consuming, using, and, in some cases, materially reconfiguring (Lievrouw, 2011) it to create content but also to conduct other activities that are not necessarily captured in the technology's configuration. Understanding Photoshop as both mediated and mediating demands that researchers seek out if, when, and to what extent people have

the capacity to alter the meanings of these objects within specific socio-technical contexts. As an example of this approach, scholars in the domestication research tradition study the mediation of television (Silverstone, 1994), the Internet (Bakardjieva, 2005), and other media in the context of everyday family life at home.

Media software is not defined exclusively by a specific use-value or occupation. Its mediation takes place through contingent (and at times contradictory) material and symbolic processes of commodification and consumption at the level of the media technology and media content; what Roger Silverstone (1994, p. 123) refers to as media's "double-articulation." Such processes are embedded within different socio-technical contexts and the relevant cultural, economic, and political forces that shape these contexts. The implication of double articulation for keeping up with digital technologies for cultural work is that while learning to use a technology and learning to make content may take place in parallel when learning to use media software, both activities should not be conflated as identical.

Our study of Photoshop's mediation should not be understood as an attempt to undermine or question the skills or knowledge of practitioners (Ross, 2012) or to question the anxiety felt by cultural practitioners in their accounts of having to keep up. Instead, this study complements the existing body of critical studies of cultural work. In it, we choose application software as our principle unit of analysis instead of a specific industry or occupation for cultural production. This choice represents a contribution to the history of the role of software in the production of culture, a history that remains woefully underdeveloped (Manovich 2013). As with domestication research, the research design attempts to capture the different moments of a media object's biography by following its design and use through diverse socio-technical contexts (Lash & Lury 2007; Lesage, 2013). While domestication research focuses on the home and family life as its principle context for writing the biography of media objects, this research design follows Photoshop's cultural biography through different socio-technical contexts in an attempt to better understand how it shapes and is shaped by practices.

Phase (a): **Using Photoshop**

Adobe Photoshop is commercial application software that enables the manipulation, correction, and creation of digital images. The application was initially developed by two brothers John and Thomas Knoll in the late 1980s and was first made available by Adobe Systems in early 1990. For more than two decades, Photoshop's design has been altered to serve a diverse group of users from professional designers to home-grown hobbyists. The software is based on two major principles: layering and filtering (Manovich, 2013). The application facilitates image disintegration by separating image elements into different layers. A visual equivalent of layering is a stack of transparencies with individual bits of an image stacked atop one another to create a whole picture. Filtering is a principle that enables various alterations to an image using computer algorithms (e.g., toning down, blurring). Photoshop's functionalities simulate an extensive array of established forms of practice, such as the paintbrush and pencil tools, while also offering up entirely new "born-digital" filters such as "wave" (Manovich, 2013, p. 131).

The findings presented in this article are drawn from media ethnography of Photoshop that includes document analysis of software reviews (Lesage, in press), as well as semi-structured interviews and participant observation. This article focuses on two separate phases of the research: what we will refer to as *phase (a)*, involving interviews with Photoshop users in Vancouver, Canada and in London, England; and *phase (b)*, a pilot investigation involving participant observation stemming from the initial findings of *phase (a)*.

The methodological framework for the design of *phase (a)* was based on generating a cultural biography of Photoshop through personal accounts of individual relationships to this object (Lesage, 2013). Of the 23 people interviewed in *phase (a),* 22 used Photoshop as part of their work for more than ten years (in seven cases, for approximately 20 years). These extended time periods meant that some informants witnessed significant technological change over the course of their careers including, in some cases, at least ten different versions of Photoshop. 23 semi-structured interviews (six in London and 17 in Vancouver) were conducted over a period of two years. Both cities were selected as examples of transnational cities for digitally mediated cultural productions (Hutton, 2009).

The sampling strategy required dissociating "keeping up" for cultural production within a single CI. In trying to get a sense of the diverse uses of Photoshop, the purposive sampling of users aimed to capture a broad set of different kinds of occupations for cultural production (Ashton, 2013) including: journalistic and commercial photography, graphic and Web design, marketing, user experience design for videogames, illustration, art, and filmmaking. For all those interviewed, Photoshop represented a standard imaging application for their occupations. The interviews were then thematically analyzed for issues pertaining to upgrading and keeping up with Photoshop.

Informants described their process for deciding if and when to upgrade to the latest version of Photoshop in very different ways. Nine of them could be classified as "lead users" (Carney, 1990) who used Photoshop extensively as part of their "tournament careers" (Stoyanova & Grugulis, 2012, p. 2), avidly staying up to date with the latest developments for Photoshop by searching online or speaking to co-workers. These people seemed to take great pleasure in honing their technical skills with Photoshop as part of both their day job and personal life (for example, working on projects for friends and family). For lead users, upgrading to the latest version was not a question of "if" but "when," involving careful considerations regarding the right version to upgrade to at the right time.

Seven of the non-lead user informants explained that they did not, or were no longer, using Photoshop as much in their everyday work. A new type of job, or a promotion to a position involving more project management, or changes in their personal lives like raising a family meant that, although the application was still a significant part of their everyday work with others, these people no longer kept up as closely with new versions. A majority of informants, however, did not view this lack of keeping up as a source of concern. Ten of the respondents even expressed the view that too much concern for keeping up with the latest version of Photoshop could get in the way of

producing good work. Jeff, a high-level art director in a videogame production company with 15-years experience using Photoshop put it this way:

> One thing I'll be very honest about is I never really had the appetite to learn any more than I needed to about software. … Because you can get lost in software and I don't know a real lot about Photoshop but I know enough that sometimes I can lose hours and, at the end of it, the execution is different but it's not necessarily better than the simple idea I presented. (Jeff, Vancouver, BC)[2]

According to these accounts, spending too much effort keeping up was unnecessary and could even be detrimental to one's ability to do good work. These distinct perspectives on the importance of, and ability to, keep up could partly be attributed to differing views on the importance of conceptual skills or straightforward technical competences (Kotamraju, 2002). Differences could also be attributed to whether informants' occupations could be categorized as either "technical workers" or "creative managers" (Hesmondhalgh, 2007 p. 64). But most informants, including lead users, recognized that Photoshop's upgrades, like other commercial application software, contained an ever growing "feature mountain" (Fuller, 2001) of which many new functions were not relevant to their occupational practices, reinforcing a generalized perception that "you can only really know 10% of Photoshop" (n.p.). A consistent theme across informants was also that the proper use of Photoshop did not depend on having the latest version of the application, but rather in demonstrating a "good eye." At its most basic level, this involved demonstrating good aesthetic judgment by following basic conventions (Becker, 1982) like saving images in the proper format, working with the right image resolution, or properly managing image layers. Knowledge of these conventions did not depend on keeping up with the latest technological changes. Instead, they required knowledge of what amounted to best practice among peers. A common sign of poor aesthetic judgment involved the overuse of new functions, such as blatantly applying a new filter to an entire image. Despite the existence of best practices, a recurring theme in this phase of the research was that there were many different ways to achieve the same result with Photoshop and that there was therefore not "one right way" to use it.

While all informants had some form of post-secondary credentials, the context in which they first learned Photoshop ranged from training sessions in higher education institutions (HEIs), to informal training through friends or family at home, to self-teaching using online tutorials. The fact more than two-thirds of the informants had been using Photoshop since its early years meant that much of their instruction was self-initiated. As Suri, a visual artist and digital filmmaker who used Photoshop for 19 years put it:

> Nobody understood how to teach the software to someone who had never used a computer before. So the teaching was pretty inadequate and very quickly I knew more than the teacher. I just bought a book and spent the time sitting down on my own reading and working." (Suri, London, UK)

Investigations on digitally mediated cultural work identify extensive links between keeping up, personal motivation to learn, and higher education (HE) (Gill, 2007;

Ashton, 2011a, 2013). Kotamraju's (2002) own findings suggest that employers equate an individual's ability to keep up with having HE credentials; however, her study does not focus on how practitioners are themselves implicated in imparting occupational practices to others. Where issues of keeping up with technological change did appear to be a concern among about a quarter of informants was in the context of teaching the application. Developing skills and knowledge for using Photoshop involved teaching others how to achieve a certain result with the application or how to use a particular functionality. While much of this teaching took place informally among peers or family members, some also found themselves organizing workshops for co-workers or designing courses in the context of HEIs. It was in this context that concerns emerged about changes to new versions of Photoshop and about having to determine what new features were worth learning in order to teach to others. Suri, who also taught extensively in art schools, described having to re-learn the application when an HEI she taught at decided to upgrade to a new version of Photoshop:

> I ignore new developments until I have to start teaching them. And then the minute I have to teach the new version, then I go online and see what's new and that's when I do it [learn new developments in the application]. I am not interested in the constantly upgrading skills you have to do. (Suri, London, UK)

Keeping up—a concern for continually updating and reformatting ones skills and knowledge to meet the requirements of technology—featured prominently when people participated in the technological economy of skills and knowledge for *teaching* Photoshop. These accounts were consistent with the dialectic between cultural work and Photoshop that included more than practices for producing content within CI. Cultural work also included teaching and learning media software with other users.

Teaching and learning Photoshop as practice

The emergence of teaching and learning as a significant part of using Photoshop may have been in part due to a sampling bias in the research design for *phase (a)*. Since most informants had extensive experience using the application, they were more likely to be perceived by others as knowledgeable users. Many informants in this initial interview phase also had close or recent ties to HEIs as teachers, students or employees. But the description of teaching and learning Photoshop nevertheless suggested a paradoxical relationship between keeping up with changes to Photoshop and sharing skills and knowledge pertaining to Photoshop. On the one hand, we were repeatedly told that it was insufficient, if not unnecessary, to keep up with the latest changes to Photoshop in order to produce quality work as a cultural practitioner, despite its status as an industry standard. On the other hand, informants spoke of teaching Photoshop—rather than their occupation—as a significant activity that required keeping up with its latest features.

Technologies play an important part in learning any skill or occupation. As Jean Lave and Étienne Wenger put it, technologies fulfill "a mediating function" (1991, p. 102) as part of the learner's inculcation into his or her chosen "community of practice." Lave and Wenger use the concept of "access" to study the different levels of practice people

can learn through technologies. Varying levels of access to technology can determine to what extent a new practitioner is able to achieve recognition from established practitioners. But their model also implies a certain degree of complicity among practitioners (at least, those who are recognized by their peers). Together, established practitioners institutionalize their shared values into what we refer to here as an "occupation" through teaching, thereby exerting influence over potential practitioners through "hegemony over resources for learning and alienation" (Contu & Willmott, 2003, p. 291). But Photoshop's status as standard media software was not limited to a specific occupation. The graphic designers, photographers, videogame designers, filmmakers, and others we interviewed recognized Photoshop as a standard in their respective occupations. Learning Photoshop provided only a very basic access to these occupations and yet, none of them believed there existed a viable substitute for Photoshop. We believe that an explanation for this paradoxical relationship lies in part in how teaching and learning the application as a way to provide access to occupational practices was inextricably entangled with the application's commodification and consumption. In this article, we refer to "introducing Photoshop" as the process through which, to various degrees, teaching and learning, design and commodification, consumption and use, are brought together within socio-technical contexts in order to engage with the material and the symbolic dimensions of media technology and content. It is this introduction that in turn enables and constrains access to occupations like photography or Web design.

Introducing Photoshop does not necessarily ensure access to occupational practice. Nor do our findings lead us to claim that people introducing Photoshop are incapable of gaining access to legitimate cultural occupations. Finally, we do not mean to suggest in the following sections that there exists only one legitimate socio-technical context for introducing Photoshop. Informants' accounts in *phase (a)* generated a picture of introducing Photoshop as a significant yet problematic mediation of access to occupations. In order to examine this process in greater detail, we turned to HEI courses as one of the socio-technical contexts for introducing Photoshop.

Higher education institutions as socio-technical contexts for introducing media software

In order to delve deeper into the problematic relationship identified in *phase (a)*, we initiated a *phase (b)*, a pilot investigation involving participant observation of an introductory course to Photoshop in order to examine the specificities of teaching and learning the application. We initially chose an HEI in Canada as the socio-technical context for a "quick and dirty ethnography" (Slater & Ariztia, 2009, p. 100) to more clearly conceptualize "introducing" as a type of mediation for Photoshop. Building from the initial insights mapped out here, we hope to extend this framework to other socio-technical contexts. Before discussing our findings, however, this section identifies three key historical facets of HEIs as a socio-technical context for teaching and learning media software, with a particular focus on North America and, where possible, on Canadian HEIs.

Art education and media software

Art education is one of the ways in which HEIs contribute to the formation of cultural subjectivities (Singerman, 1999). Like other disciplines, art education is "organized

around a particular culture and ethos of academic community" (Robins & Webster 2002, p. 5). In the first years of micro computing, art educators hoped to take a central position in developing educational software by emphasizing creative thinking and artistic self-actualization. Early educational literature on integrating media software into the North American classroom expressed excitement about the new pedagogical possibilities it afforded. Some educators taught graduates to be proficient in different programming languages and to be able to write their own media software (Eber, 2000). Others emphasized that the future of software for teaching the arts should be guided at its core by relevant teaching philosophies (Welter, 1989). However, these same educators soon became disillusioned with existing software.

The early stages of integrating digital technologies into art classrooms represented a challenge for educators in that few knew how to teach computing or even design a course that made use of software (Ettinger, 1989; Welter, 1989). Educators were pressured to operate with curricula that emphasized drill-and-practice (Johnson, 1997; Newcomb, 1988) and the provision of transferable skills over artistic-discovery and aesthetics (Johnson, 1997; Welter, 1989).

Some educators expressed concern that software design would define learning objectives and homogenise art graduates' skills as they practiced with limited technical aspects of the medium (Freedman, 1991). Most HEIs were faced with problems of limited funding, lack of trained professionals, institutional decision-making anxiety, and poorly designed curricula. These constraints were likely to foster standardization. For some teachers and academic researchers, these shifting pressures explained the early dominance of application software, like Photoshop, in HEI art education (Nadin, 1989).

Professionalization for the CIs

The implementation of a North American model for CI revolved around art-centric businesses, leaving art education vulnerable to two major influences: that of policy-makers and that of a global marketplace (Murray & Gollmitzer, 2012; Roberts, 2010; Throsby, 2008). By 1990, traditional universities faced increased competition from new types of HEIs, including for-profit universities, distance education learning, professional schools, and certificate-granting bodies (Hanna, 1998). Such vulnerabilities resulted in a deep integration between universities and industry, an emphasis on skills- and employability-focused programs, and highlighting the commercial and entrepreneurial aspects of cultural work (Calver, Gold & Stewart, 2013; Cunningham, 2002; Hanna, 1998). Canadian HEIs were encouraged to maintain a "dual focus"(i.e., aesthetics and skills) in educational processes in order for creativity not to be lost in the "cognitive shuffle" (Conference Board of Canada, 2008, p. 40).

Neoliberal tendencies in North American HEIs provided a complex backdrop for how the relationship between technologies, the skills required to use these technologies, and cultural practices were articulated. Industry professionals, not educators, were allowed to set the agenda for software development (Webster, 1992). The growing pressure on HEIs in general and the nitty-gritty details of institutional decision-making resulted partly in a shift in teaching towards professionalization across HEI curricula.

The emphasis on professionalization resulted in programs that focused on "narrow notions of skill and employability" (Murray & Gollmitzer, 2012, p. 426). In the case of teaching and learning cultural occupations, the biases of creative professionals towards particular methods, software, and required skills became the preferred direction for HEI teaching, which privileged these occupational practices while marginalizing divergent models of art education. An overview of 122 Canadian HEIs offering some kind of training in digital media in 2004 (Delvinia, 2004) showed how these HEIs faced a myriad of complex questions from how and what to teach students, to where creative education modules fit within their organization, to what kind of application software to use.

Lifelong learning and cultural work

This brings us to the final of the three historical facets for HEIs as socio-technical contexts for introducing Photoshop: the importance of lifelong learning as part of cultural occupations.

Some argue that lifelong learning preceded the modern education system itself (Whelan, 2004), with its historical lineage tracing back to self-education brochures in the 18th century. Since then, lifelong learning has catered to a variety of different people, including cultural practitioners. According to one Canadian study, a substantial number of 1995 Canadian graduates (specifically, 68% of under-25s and 56% of 25 and overs) "enrol[ed] in courses and programs in community colleges and technical institutes to learn additional employment-relevant skills" (Adamuti-Trache & Schuetze, 2009, p. 102).

The Cultural Human Resources Council (CHRC) of Canada identifies keeping up as one of the principle challenges for Canadian cultural practitioners (Cultural Human Resources Council, 2011, p. 11). Following a cross-sectorial analysis, one of CHRC's main recommendations is the provision of more "continuous learning opportunities" for creative practitioners (Cultural Human Resources Council, 2011, p. 27). Cultural practitioners face a precarious, irregular, and demanding workplace that requires the development of transferrable skills and an ability to conduct independent learning. Continuing education for the most part emphasizes the kind of professionalization that can be acquired through activities that reflect how knowledge will be applied "in real life." Kotamraju's own research concludes that Web designers require a broad, flexible, upgradable set of skills to stay relevant to the industry. Continuing education works as the flipside of the "keeping up" coin, instilling in individuals what Daniel Ashton (2011a), drawing from the governmentality literature, calls "upgrading the self." Informant accounts in *phase (a)* echo existing critical literature by emphasizing both continuous informal learning as an essential way to acquire the skills and knowledge related to their occupation as well as the importance of participating in HEI-designed continuing education to keep up with technological change. The informants who were interviewed for this research with secure positions could, for the most part, count on the support of employers to pay for continuing education courses. Those in freelance positions had more difficulty gaining access to these types of opportunities.

Sources of continuing education in application software are not exclusively available through traditional HEIs such as universities and community colleges. Other

sources include private, for-profit training centres and various online resources, ranging from amateur YouTube videos to Massive Open Online Courses. Indeed, in the process of this research we realized that the production and consumption of teaching resources for application software is an industry in itself.

Of 30 curricula of Canadian continuing education introductory courses to Photoshop found through an online search (including courses taught by publicly funded universities, community colleges, and private for-profit training centres[1]), most emphasize three aspects of the application. First, almost every curriculum describes learning Photoshop in terms of learning the application's functions. Course curricula promise to teach students how to use Photoshop to alter images in order to achieve certain effects. Second, most curricula emphasize Photoshop's status as a professional standard across multiple CI and stress that graduates will gain an understanding of Photoshop's basic functionalities through hands-on experience with the application. Lastly, only a few curricula mention some kind of aesthetic theory as a part of the course (such as theory of colour).

Based on the three historical facets presented above, HEI teaching and learning for media software in Canada 1) privileges standard application software over potential alternatives; 2) strives to replicate professional use of media software, as defined by CI occupations; and 3) positions learning media software within a longstanding lifelong learning tradition of individual self-improvement and constant re-skilling.

An introduction to Photoshop

Following from the above account of how HEIs have historically contributed to the configuration of media software (and application software specifically), we now turn to a more detailed case study of an introductory course for Photoshop. In 2012, one of our researchers with previous experience using Photoshop enrolled in an introductory Photoshop course as part of a continuing education program in a Greater Vancouver HEI. Many of these types of courses are taught across Canada and many more similar courses are available throughout the world. The selected course only lasted five evening sessions for a total of 15 hours, which was consistent with other similar types of lifelong learning courses we reviewed. This course was offered as part of a lifelong learning program geared toward people seeking to improve their employment prospects. Introductory courses to Photoshop are also offered in other HEI and non-HEI contexts, such as within vocational programs in Canada (for example, a graphic design certificate) or online training courses. We will discuss the implications of this choice later in the article.

The registration process took place entirely online; we selected one of the courses available in September 2012 and paid for registration (a little over CAD$300). A letter subsequently arrived by post confirming registration, providing us with a student number, and informing us of the time and location for classes. Following this letter, all of the subsequent interactions with representatives of the HEI consisted of interactions with the course instructor. All participants in the course were given a one-page description of the research during the course and assured confidentiality. Those who chose to participate in follow-up interviews, including the course instructor, gave informed consent to participate.

"Getting started"

The course consisted of classes taught in a Personal Computer (PC) lab in one of the HEI's teaching facilities, with seven to ten students participating in the course, depending on the day. After a quick set of instructions for how to log onto the PCs, the course instructor, who we refer to here as Ted, asked students to purchase the course textbook from the HEI bookstore.

The book was titled *Adobe Photoshop CS5 Classroom in a Book*, published by Adobe Press, which is a subdivision of Peachpit Press, in turn part of the massive corporate entity known as Pearson Education. Peachpit publishes an enormous amount of material on Photoshop and other similar Adobe Systems products. For example, a quick search of the keyword "Photoshop" on Peachpit's website in September 2013 produced a list of 320 books, eBooks, and other Photoshop-related products. The course design was based almost entirely on the lessons presented in the book. Its fourteen chapters were written as individual lessons: Chapter 1, Getting to know the work area; Chapter 2, Basic photo corrections, et cetera. Each of these lessons involved working on a pre-set image file available on a DVD included with the book. The introduction to the book, "Getting Started," stated:

> The lessons are designed to let you learn at your own pace. If you're new to Adobe Photoshop, you'll learn the fundamental concepts and features you'll need to master the program. And if you've been using Adobe Photoshop for a while, you'll find that Classroom in a Book teaches many advanced features, including tips and techniques for using the latest version of the application and preparing images for the web. (Adobe Systems Incorporated, 2010, p. 1)

Teaching Photoshop

After returning to the PC lab, Ted explained that this introductory course would cover a lot of ground and that he would only have time to teach us the basics. Consistent with accounts from *phase (a)*, Ted warned students that he could not teach "the right way to do things" because there were "100 different ways" to achieve the same result with Photoshop. He assured students that, over time, we would find our "own way." Students were encouraged to purchase a licence for Photoshop at an educational discount available to anyone registered through the HEI at well below the regular price.

Ted explained his teacher-practitioner (Ashton, 2013) background as that of a digital imaging technician for the Web and a Web designer. In a follow-up interview, he elaborated on how application software like Photoshop fit within his own work:

> I just think that they are really useful tools for day-to-day needs: making selections and creating objects. So I guess I am more … I don't know how to describe it. I am not that artistic so generally I try to use Photoshop to extract pieces of other people's artwork and create simple objects on my own, but as far as taking a paintbrush and creating a picture, that's not what I do.

Our introduction to Photoshop did cover a lot of ground. Lessons ranged from uses that applied to a number of cultural occupations including photography, fine art,

graphic design, and digital imaging for the Web. Ted's view of Photoshop's role in his own work was reflected in his teaching. While he closely followed the lessons in the book—from photographic retouching (Chapter 2), to preparing images for color printing (Chapter 14)—he frequently commented on whether or not he found the functions explained in the lessons useful for his own work. For example, while learning the "mixer brush" tool to create painting-like effects on an image (Chapter 11), he made it clear that this more artistic function was of little use in his line of work.

Learning Photoshop

Part way through each class, Ted asked students to continue the lessons in the book on their own while he provided help to individual students. Each lesson took the reader through a step-by-step process to modify a certain image, prescribing exactly how to achieve a certain predetermined result. The images used in the lessons seemed to have been selected with each lesson in mind. For example, an image of a rocket flying in the sky with a clear distinction between its foreground and background made it easier to learn how to use a set of functions to select a foregrounded object—in this case the rocket. The lessons specified the exact order of each function and the numerical value of each modification without any explicit justification. This strict lesson plan led one of the students in class to comment something along the lines of "I am now great with Photoshop as long as it involves working on a picture of a rocket." These lessons highlighted how, beyond their pedagogical value for the execution of set functions, the aesthetic value of the images was not a consideration other than to what extent the students' final results compared to the images from the book.

Follow-up interviews

Two of the students in the class agreed to follow-up interviews at the end of the course to discuss their experiences learning Photoshop. We will turn to a specific situation stemming from accounts from both participants in order to examine how students engaged in the process of introducing Photoshop.

"PAULINA"

Paulina was originally from South America, where she studied in an HEI for five years to become a graphic designer. Her studies included everything from pencil drawing to a basic introduction to desktop publishing application, and she subsequently worked in a graphic design agency. Paulina had recently moved to Canada to study English and at the time worked in a service sector job for a courier company/copy shop. Her employer offered financial support for training in desktop publishing applications and from there she started taking other courses, including this one through her own initiative. Similar to some accounts in *phase (a)*, Paulina not only used application software like Photoshop for occupational purposes, but also for personal enjoyment. She worked extensively on illustrations and comics in her free time. She had already dabbled a bit with Photoshop before taking the course but preferred Corel Draw. For Paulina, her background enabled her to "see" and "think like a designer":

> to see if something is really centred or not. You know stuff like that. Or if the colours are good, matching. And it depends on your taste of colours, if you see something and you're like "no, it's not good," you can decide

this because you studied. [Also] probably because I like to draw since I was little.

She felt her background gave her an advantage for learning Photoshop functions in the course. She also felt that her newfound understanding of Photoshop would be useful in her job: if clients were dissatisfied with the result of a printing job, she was now better equipped to explain why the client's image might not have been properly created or formatted for the printer. Paulina mentioned a number of times how others in the course found it difficult to get as much as she had had out of the course.

Did you hear the girl at the last stage, she was feeling like she didn't learn anything when we finished Photoshop. I didn't feel like that, I mean it's just five classes but I feel like I really learned a lot. And because I was really trying to see at work and at home to get more … But I don't know if they are doing that or if they don't have the mind.

This account suggested that Paulina wavered between two alternative explanations for her colleagues' frustrations. The first was tied to a lack of self-discipline: Paulina was careful to continually draw from her own experiences in order to improve her skills, including practicing and learning Photoshop from colleagues or testing out her abilities on personal projects. The other explanation was that they lacked some innate faculty: the "eye" or the "mind" that would enable them to take full advantage of the application.

"ADELE"

One of the frustrated students in the course was Adele. Also in her 30s, she immigrated to Canada from New Zealand with a bachelor's degree in Communication. Although she had been informally introduced to Photoshop while in university, working with it was not part of her career goals. She was currently working as the sole representative of the marketing department in a small manufacturing and import/export company that also required that she accomplish a good deal of graphic design work on her own. Her employers had partially funded this course to help her better execute some of these tasks:

We need a product photo for the catalogue and flyers so I need to edit up the background and adjust lighting and touch ups [on the image of the product]. So sometimes we will get a [product]: just the sample that's not printed with our labels. So I need to be able to Photoshop-in labels on the [images] that are arriving. Things like that.

Adele expressed frustration with her experience learning Photoshop. When asked about these frustrations, she focused on the challenge of knowing the "how" but not the "why":

[The teacher] give[s] you specific values and tells you what tool to use but he doesn't necessarily say why. So a little bit more understanding, which I guess is just all stuff that you kind of have to teach yourself and play around with it anyway.

Adele felt that she had learned how Photoshop's functions could be used to alter images but her newfound skills were not enough to produce things she found aesthet-

ically pleasing. In some sections of the interview, Adele placed the responsibility to develop these skills further on her own shoulders. At other points, she expressed the desire to work with someone who already had such skills:

> I am not a graphic designer and I am not artistic. That's probably the most difficult thing. But that's not Photoshop's fault. It's the operator. I don't have the artistic eye for things. Which is why you need to pay a graphic designer to do these things. So that's probably the hardest part of Photoshop really, is actually getting things to look like a professional did it.

In these accounts, Adele hinted at the need to develop the kind of self-discipline that Paulina described in her own account. Adele felt she would have to compensate for not having this "artistic eye" or access to such expertise by trying to acquire a sufficient amount of experience using the application on her own. In the interview, she mentioned how she had already started editing travel photos and preparing a bachelorette invitation for a friend in her spare time.

Discussion of findings

The experiences both students had acquired prior to taking the course equipped them with very different capacities to learn the application. Paulina's introduction to Photoshop fit within an existing learning trajectory, having already been initiated to graphic design practices. Adele's introduction to Photoshop only cemented her belief that she was not equipped with the skills or knowledge required to produce good work.

It is unfair to consider these results a failure to teach the material on the part of the course instructor. Considering the introduction to Photoshop in light of the course design and the students' occupations, Ted seems to have fulfilled his objectives. Both students work in occupations similar to digital imaging for the Web where Photoshop is used to modify images in ways that are highly constrained and with limited creative input. They edit images created by others based on technical conventions, such as ensuring that images are printed using the right resolution or slightly altering certain aspects of images to ensure that they fit within a standard image template. The course taught them basic conventions consistent with the kinds of best practices informants described in *phase (a)*.

But what does this account of introducing tell us about the paradoxical relationship between keeping up with Photoshop and the practices of teaching and learning how to use it? It is here that remaining attentive to Photoshop's status as both technology and content provides some insights. Teaching Photoshop affords the teacher-practitioner an opportunity to impart to students the basic principles and values that are part of his own occupation: students now have a basic understanding of digital imaging for the Web. But Ted's provision of access to his occupational practices is also undercut by "teaching Photoshop" as an HEI course in that such teaching entails presenting functions that stand outside the boundaries of his own understanding of his occupational practices. Photoshop and its teaching materials are designed, marketed, and sold as a flexible tools for creating or treating any kind of digital image in ways that extend beyond a single occupation or socio-technical context. New versions of Photoshop do represent technological transformations. But Ted only needs to keep

up with the changes brought about by new versions of Photoshop at two different yet overlapping levels in order to teach how to use it: 1) if and how changes alter what constitutes a basic or "introductory level" of understanding of Photoshop (itself dependent on factors such as how the textbook is designed); and 2) if and how changes alter the provision of access to his own occupation.

Similarly, the reasons both students give for setting out to learn Photoshop basics is not limited to finding new or improving existing skills for their occupation. Both are self-motivated to learn more about Photoshop as a way to improve their overall view of themselves as creative individuals. But such a project requires a long-term individual engagement through consumption and use to find their "own way." Somewhat ironically, students are simultaneously configured as users of highly ordered Photoshop functions and as individual sources of skill and creativity. The course does not afford opportunities to apply or develop such creativity when editing the textbook images. Paulina and Adele's alienation from most of the images in the course and from those in their workplaces meant that they have to use the application in other socio-technical contexts to be able to nurture their aesthetic judgement through alternative creative practices. For both, the solution entails engaging in creative work-on-the-self (Ashton, 2011a) at home during their spare time. If and how either continues to keep up with Photoshop depends on how they pursue this project and whether the consumption and use of the application between sites that include the home, their workplaces, HEI, remains a part of this project.

In light of the observations in *phase a* and *b*, both teaching and learning to use Photoshop and teaching and learning to edit images as part of an occupation are overlapping yet distinct activities. Introducing Photoshop does not fit neatly into one specific community of practice or type of CI content, making keeping up to Photoshop very different things to different practitioners at different stages in their careers.

Conclusions and implications for future research

Existing research highlights how CI practitioners must engage in lifelong learning in order to keep up with technological change to remain relevant in their occupation. Our research suggests that keeping up with media software must be conceptualized as a dialectic relationship between media software, content, and socio-technical sites for cultural work, including HEI teaching and learning. *Phase (a)* examined how different cultural practitioners use Photoshop as a cross-industry commercial standard for digital imaging identifying a paradoxical relationship between keeping up with changes to Photoshop and how established and new practitioners use it as a mediating object for gaining access to occupations.

The findings from *Phase (b)* support our claim that keeping up with Photoshop extends beyond learning its use-value for specific occupations. Teaching and learning Photoshop is part of a complex process of mediation we call "introducing" as a form of keeping up. Because the socio-technical context for our pilot was a continuing education course in a more traditional Canadian HEI, future research should compare how introducing Photoshop takes place in other socio-technical contexts, including other types of HE programs (for example, that provide access to other occupations), as well as HEI programs in other countries. Future research should also question how

HEI and media software could serve as sites and objects for more critically informed approaches for teaching and learning cultural work. Greater research into the process of introducing media software like Photoshop is required so that we may better understand its role within CIs.

Notes

1. Six of these training centres are listed on Adobe's website as the only "Adobe Authorized Training Partners" in Canada (see http://training.adobe.com/training/partner-finder.html#p=1&country =Canada).

2. All names have been anonymized.

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