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Learning with Digital Portfolios: Teacher Candidates Forming an Assessment Identity

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Learning with Digital Portfolios: Teacher Candidates Forming an Assessment Identity

Abstract

This study focuses on how the use of digital portfolios in teacher education can support teacher candidates to shift their understanding of assessment as they form their assessment identity. The study was in the context of changing curriculum and assessment practices promoted in British Columbia. We draw on data from a cohort of teacher candidates in the first term of a 16-month post-degree teacher education program, where they created a digital portfolio across multiple courses as part of their final assessment to be used in an exit interview with instructors and teaching professionals from the field. Narratives of teacher candidates' experiences were collected to shed light on their changing understanding of assessment for learning practices and their emerging teacher identity as assessors promoted by the digital portfolio process. Significance of using digital portfolios to support their process of becoming teachers is focused in the conclusion of the paper.

Cette étude se concentre sur la manière dont l'utilisation de portfolios numériques dans la formation des enseignants et des enseignantes peut soutenir les candidats et les candidates à l'enseignement pour changer leur compréhension de l'évaluation alors qu'ils forment leur identité d'évaluation. L'étude s'est déroulée dans le contexte d'un programme d'études et de pratiques d'évaluation en changement favorisé en Colombie-Britannique. Nous nous appuyons sur les données d'une cohorte de candidats et de candidates à l'enseignement récoltées au cours du premier trimestre d'un programme de formation des enseignants post-diplôme de 16 mois, au cours duquel ils ont créé un portfolio numérique couvrant plusieurs cours dans le cadre de leur évaluation finale pour être utilisé en tant qu'entrevue de fin de programme avec des instructeurs et instructrices et des professionnels et professionnelles de la profession. Les narrations des expériences des candidats et des candidates à l'enseignement ont été rassemblées pour éclairer leur compréhension en changement de l'évaluation des pratiques d'apprentissage et leur identité naissante en tant que professeurs et professeures devenus évaluateurs et évaluatrices promus par le processus du portfolio numérique. Dans la conclusion de l'article, l'importance de l'emploi de portfolios numériques pour soutenir le processus qui consiste à devenir enseignant et enseignante est soulignée.

Keywords

teacher identity, assessment, digital portfolios; identité en tant qu'enseignant ou enseignante, évaluation, portfolios numériques

This research study is situated within the context of Teacher Education with a focus on how teacher candidates (TC) shift their understanding about assessment and the use of digital technology through their first experience of developing a digital portfolio (dP). Typically, teacher candidates have experienced assessment practices focused on ranking, getting high grades, and teacher focused grading. Consistently, education reviews into assessment in schools advocate that the direction of education, in relation to assessment practices, should shift from ranking students to one of ensuring that all students learn to specified personalized standards, and that students should increasingly have opportunities to take more ownership for their learning (Black et al., 2004; Fu, Hopper & Sanford, 2018; Harlen, 2005; Harlen & Deakin Crick, 2002). Stiggins (2005, 2007) argued, over a decade ago, that the purpose and form of assessment needs to be changed to engage students in their own learning and create capabilities for determining their own learning pathways. In agreement, Black and Wiliam (2009) advocated that we need a theory of assessment for learning, in line with Stiggins, that promotes not only the motivation for all students to learn, but also improves the learning conditions created by the teacher and the students working together. Regarding the Canadian context, Roscoe (2013) pointed out that in K-12 education, the overall emphasis in assessment is moving from determining and reporting grades towards tapping the potential of assessment to engage all students in meaningful learning (see also Black et al., 2004; Mentkowski, 2000; Stiggins et al., 2006; Wiliam, 2011). Teachers play a key role in shifting assessment practices and intentions for their students, and it is important that new teachers develop understanding of the important role assessment plays in the education of their students. In this paper we focus on ways in which teacher education can support TCs to shift their understanding of assessment to better support their students' learning, considering how TCs, as they enter a post-degree teacher education program, create a teacher identity in line with this shift in assessment practices.

Looney et al. (2018) pointed out that teachers' assessment knowledge is a complex structure, and that teachers' assessment practice is a sociocultural activity shaped by teachers' values and beliefs, including their experience of being assessed. In Teacher Education practice, we see TCs' transformation from student to teacher (i.e., developing a teacher identity) as vital since we want our TCs to support their own K-12 students to become independent and confident learners. We and others have explored the idea of shifting TCs from student mindset to a teacher mindset (Hopper & Sanford, 2010; Kitchen & Russell, 2012), i.e., developing "a student mindset where they did courses for grades, to a teacher mindset where they [take] responsibility for their own and others' learning" (Kitchen & Russell, 2012, p. 77). In addition, this teacher mindset needs to be open to technological advances that support human learning and in particular the use of digital media that is a critical feature of modern data society (Siemens, 2004; Trilling & Fadel, 2012). We believe that this transformation process means fostering an active learning attitude, a growth mindset (Dweck et al., 2011) that builds teacher competencies for teaching 21st century skills that are personalized and informed by an array of digital literacy skills (Siemens & Matheos, 2012; Walker et al., 2017). A significant aspect of developing this type of digital literacy teacher mindset is the development of TCs' teacher assessment identity, encouraging them to reconsider their complex and intertwined roles as "teacher" as well as judging students' learning to enable them to progress and be motivated to learn more meaningfully. Previous research has identified electronic portfolios as supportive of pedagogical innovation, offering effective tools to evaluate student competencies in curriculum and professional learning, and pointing to the value of digital or electronic portfolios in both developing and assessing competencies (Hanbridge et al., 2018). Recognizing that learning and assessment are integrally connected, we realize that what informs TCs' often multiple and conflicting conceptions of assessment and simplistic

assumptions about learning is a key prompt to pedagogical decisions based on more than past experiences and unexamined beliefs.

To explore this notion of assessment identity we draw on data from a cohort of TCs in the first term of a 16-month post-degree (PDP) teacher education program in Western Canada. This data is part of a five-year SSHRC-funded project examining the use of dPs in Teacher Education. Our purpose in this paper is to investigate how the use of dPs in teacher education programs enables assessment for learning practices and consequently contributes to building a teacher assessment identity. With the understanding that learning and assessment are intrinsically tied, we ask two interconnected research questions: “How do TCs experience learning to become teachers through the dP process?” and “How does the use of a dP influence TCs’ forming teacher assessment identity?”

Theoretical Framework

Assessment for Learning

Assessment is central to learning. Wiliam (2011) believes that assessment can bridge teaching and learning by making it possible for teachers to attune their planned instructional activities for consequent increase in learners’ capabilities. This conceptualization of the role of assessment thus makes formative assessment, assessment activities that are aimed primarily at providing feedback for enhanced teaching and learning, ever more relevant to learning. In fact, “to be effective, formative assessment has to be integrated into classroom practices, requiring a fundamental re-organization of classroom operations” (Wiliam, 2011, p. 142). The terms “formative assessment” and “assessment for learning” converged through the theoretical synthesis of Black et al. (2004), who suggested that “assessment for learning” refers to any assessment for which the first priority is to promote students’ learning, and the assessment becomes “formative” when the evidence is used to inform teaching and learning decisions. However, Wiliam (2011) also pointed out that the potential of assessment to guide learning still has not been well realized as prior meta-studies (e.g., Crooks, 1988) showed that the summative function of assessment is dominant, where grades have been provided to show “how much” has been learned. Highlighting the impact of teachers and continuing the discussion on assessment *for* learning, Hattie (2012) proposed the alternative of “assessment as feedback,” when such assessment feedback is oriented toward students’ growth and development. In the instance of TCs who are moving towards criteria determined for “success,” (e.g., identifying what they have/have not taught well or strengths and gaps of their teaching) the feedback should be intended for ongoing learning rather than judging and ranking (Hattie, 2012). Hattie’s meta-study has also provided evidence that feedback is among the most common features of successful teaching and learning.

For Hattie (2012), the formative interpretations of assessment information by teachers have the potential to move students, where “student assessment capabilities” are promoted so that students can assess their own learning (see also Absolum et al., 2009). With the claim that “when students participate in the assessment of their own learning, they learn to recognize and understand main ideas, and to apply new learning in different ways and situations,” this “formative interpretation in action” enables students to “access, interpret, and use information from quality assessments in ways that affirm or further their learning” (Hattie, 2012, p. 126). This idea of enabling students to receive feedback and formatively assess their own learning also correlates with the purpose of education to develop autonomy in learning and for students to become self-regulated learners (Wiliam, 2011).

Grading Contracts and dPs

With Hattie's (2012) claim that teachers are the major players in the education process and have the most impact on learning, we consider how Teacher Education programs can support the development of the kind of TCs who "walk the talk" to realize the power of assessment in schools. Further, we consider how we work with TCs so that they experience such assessment and can therefore guide their future students through the learning process. Building on findings about the practice of grading students as not being accurate, consistent, meaningful, and supportive of learning (Black et al., 2004; Guskey, 2014; O'Conner & Wormeli, 2011), many Teacher Education programs are working toward making their assessment practices relevant to enabling TCs' learning.

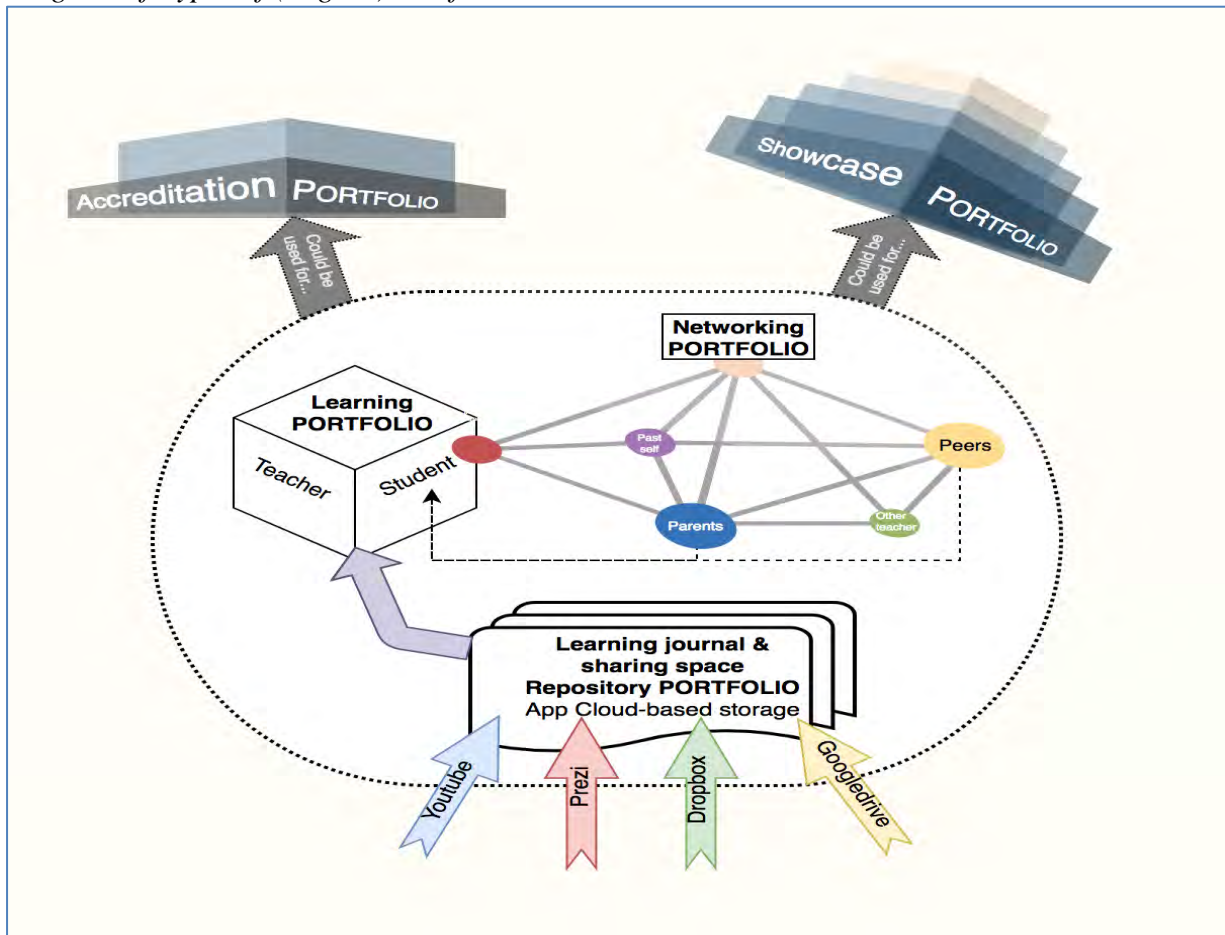
Alternatives to grades are slowly emerging so as to realize the promises of assessment for learning. One of the practices utilized is a "grading contract" approach with TCs, where they "determine and specify at the beginning of a class the grade they would like to earn, from a set of instructor-defined parameters" (Lindemann & Harbke, 2011, p. 1). Contract grading eliminates the highly subjective gradations, links grades to the quantity of high-quality work completed, and allows students more opportunity to control and monitor their own learning (Lindemann & Harbke, 2011; Radican, 1997). More importantly, "contract grading focuses wholeheartedly on processes where conventional grading focuses much more on products, outcomes, or results" and in contract grading what counts is "going through the motions" (Danielewicz & Elbow, 2009, p. 260). However, as "the ideas of subjectivity and the cultural importance of grades still remain" in contract grading (Hara, 2010, p. 3), it inevitably ties TCs' identity to a sometimes less positive but acceptable grade, such as "B" when they have been socialized to desire very high grades.

Another alternative to traditional grading practice is collecting learning evidence for a portfolio that functions as a learning, assessment and competence demonstration tool. Davies et al. (2017) pointed out that the process of students' documenting their own learning helps them to learn more, particularly because

when students are involved in self-assessment and reflection, they provide themselves with regular and immediate *descriptive feedback* to guide their learning, [and] they become more actively involved in a curriculum that otherwise may seem unrelated to their lives and personal experiences. (Italics original, Davies et al., 2017, p. 27)

We believe both the "grading contract" and "portfolios of learning evidence" are important in rethinking assessment practices in our current Teacher Education program. The synergy of the two can both free the "grading contract" approach from the inevitable "grades" that may still ultimately sway teaching and learning practices and provide an anchor point (and external motivation) for students' collections of learning artifacts. We view dPs as a convenient tool to support a living and emerging complex process of rich-media digital tools serving multiple purposes and existing within a living learning system that is continually changing as it grows (Hopper et al., 2018). For the past six years, we have been researching dPs as "connective tissues" in teacher education to address the fragmentation of professional courses in teacher education programs (Hopper, Sanford, & Hong, 2016), and we have explored how dPs allow TCs to cement their own development based on a more informed understanding of the complexities of learning and teaching (Hopper et al. 2018). As seen in Figure 1 below, we offer an understanding of different types of dPs and purposes. The focus of dP as we rethink teacher education is on learning, sharing and networking, rather than on accreditation or showcasing.

Figure 1
Diagram of Types of (Digital) Portfolios



Assessment and Teacher Identity

Looney et al. (2018) and Xu and Brown (2016) point to the need to address the connection between teachers' assessment practices and teacher identity development, in particular to understand their assessment identity formed from years of being assessed as a student. Drawing on Stiggins's (1991) research into assessment literacy, a concept to refer to the assessment knowledge and skills and the broader capacity to use assessment evidence to guide and report student learning, Looney et al. (2018) argued that teachers' assessment knowledge is a complex structure and that teachers' assessment practice is a sociocultural activity shaped by teachers' values and beliefs, including their past experience of being assessed. Through an in-depth literature review on teacher assessment literacy, Xu and Brown (2016) have drawn a conceptual framework of teacher assessment literacy in practice, where "teacher as assessor" stands at the top of their conceptual framework of teacher assessment literacy in practice. In this framework, pre-service teachers "transform their identities from being students who are assessed into teachers who plan, implement and evaluate students using assessment tools" (p. 158). Therefore, teachers' assessment practices go far beyond the knowledge and skills that are often taught as discrete courses or even "add-ons" in Teacher Education programs. Rather, assessment is part of the construction of teacher identity in TCs' experience of shifting from "students" to "professionals." Similarly, a clearer sense of their own identity as assessor will empower them to become more competent in assessment practices (Xu & Brown, 2016, pp. 158-159) and to realize assessment for learning for their own students.

Methodology and Context of the Study¹

Drawing on Merriam (2009) and Smith and Sparkes (2020) we used a qualitative descriptive process focused on participant interviews and anecdotal insights; the research project drew on one cohort of TCs and their instructors in one term of a four-term program. The cohort of students were all taking the sixteen-month program to become certified as secondary teachers. The focus in the study was on TCs' assessment identity as they learned about different forms of assessment and then experienced creating a dP of their professional learning. To answer the research questions "How do TCs experience learning to become teachers through the dP process?" and "How does the use of a dP influence TCs' forming teacher assessment identity?" this study used TCs' and instructors' interviews as data sources, which is further described below. In the data analysis process we focus on narratives generated by the participants in order to explain their insights. We believe that the "stories lived and told" (Clandinin & Connelly, 2000) are powerful in studying identity-related topics due to the intrinsic link between narratives and identities (Gill & Goodson, 2011). Therefore, we look for the stories told by participants in relation to their experiences with assessment and digital technology and arrange these into broad categories related to past and current experiences.

Data in this study came from twelve students in a cohort of fifty-six TCs in two classes. As PDP students these TCs had previously obtained a degree in a specific field of study. In three of the five courses the TCs took in this particular semester, they created a dP, where artifacts, evidence of learning to address program competencies, were gathered from course experiences by the TCs and then reflected on as evidence of them demonstrating the teacher competencies. The dPs created were not marked or assessed; rather, as part of TCs' "learning contract," they functioned as a hub to collect TCs' work and reflection during their semester of learning to then use as evidence of addressing program competencies at the end of a term in an exit interview once the dP had been passed by the instructors. The teaching competencies were grouped in relation to Personal and Professional preparation, Collaboration and Community engagement, and Exploring and Enhancing pedagogy, and the competencies aligned with ministry of education standards required to become certified as teachers (Hopper, Sanford, Fu, & Monk, 2016).

At the end of the term, TCs engaged in an exit interview as a culminating event to the semester. During this interview, TCs, in pairs, demonstrated their learning using their dPs in an interview with two professional educators from the field. Immediately following these exit interviews, TCs who had volunteered were interviewed about their insight on assessment, use of the digital technology and the dP process.

Research Design

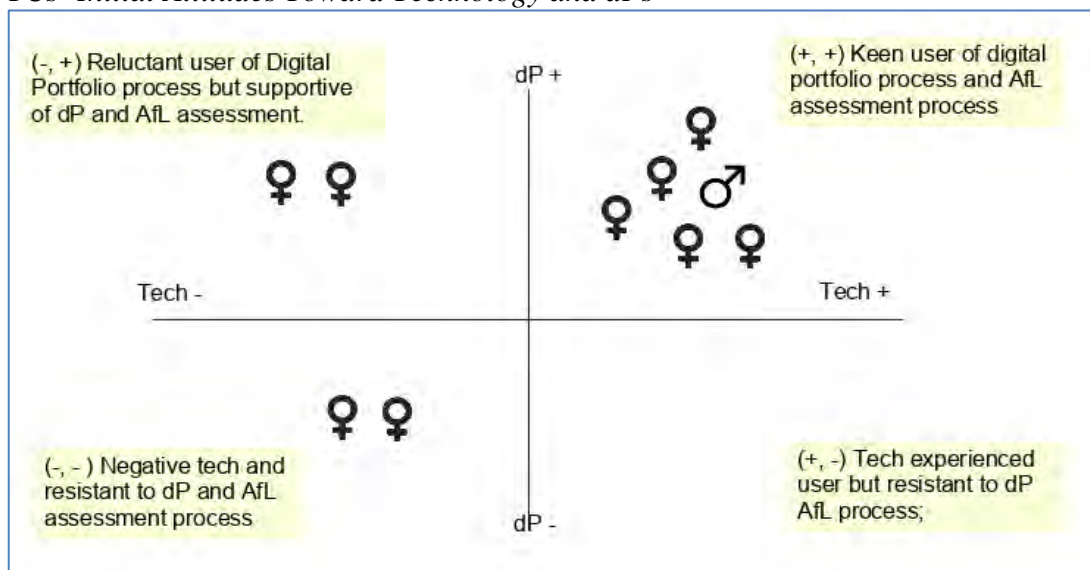
To recruit potential participants, a consent form was administered in the first two weeks of the term inviting TCs to be involved in an interview at the end of the term in relation to their experiences using a digital portfolio. In order to get a wide spectrum of TCs with differing initial attitudes toward digital portfolios and assessment, two course instructors (one the Technology Innovation in Education course the other Multiliteracies Curriculum) identified TCs who were either: (a) tech experienced user but resistant to dP assessment process (+, -); (b) keen user of digital portfolio process and assessment process (+, +); (c) negative about technology and resistant to dP assessment (-, -); or (d) reluctant user of dP process but

¹ This research has received Ethics Approval by University of Victoria with ethics protocol number 18-146.

supportive of dP assessment (-, +). The categorization of TCs to the above four types was subjectively and voluntarily made by the instructors based on their experiences with TCs in the course after the first 6 weeks of the term. Both instructors agreed upon 12 TCs, as shown in Figure 2. These twelve students became the focus of the interview data.

The research interviews were conducted by research assistants who did not teach the TCs and immediately after the TCs had completed their program term exit interview. The interview focused on dP process, attitude about dP and technology, insights on assessment experiences, use of assessment in other courses and use of digital portfolios in the future (see Appendix).

Figure 2
TCs' Initial Attitudes Toward Technology and dPs



Of the twelve identified TCs, ten were interviewed immediately after they completed their exit interview. Two others declined at the time after the exit interview and were not able to be interviewed. The composition of the interviewed TCs' attitudes to technology and assessment for learning practices is described in Table 1. Note these classifications of attitude were not necessarily how the TC started the courses, as some indicated in the research interviews, but rather how they ended up. All names are pseudonyms.

Table 1
Composition of TCs Interviewed

	+, +	+, -	-, -	-, +
TCs	Aria, Bettie, Carter, Diane, Emily, Hailey	(two absents)	Mia, Nicole	Olivia, Sophie

We were not able to interview the two TCs identified as (+,-). The reason for the larger proportion of TCs who were identified as positive to digital technology and dP assessment process is potentially because those TCs were more inclined to participate in the interview.

Data Analysis

The interviews were approximately 30 minutes long and were video recorded. The recordings were uploaded to an unlisted YouTube playlist and transcribed using the auto-generated caption function (Hopper et al., 2021), then edited into a traditional transcript. This resulted in ten interviews ranging from 2300 to 5000 words each. The transcripts were initially coded in NVivo by one member of the team for narratives that addressed our research questions. The initial codes were further read and verified by other members of the research team made up of two graduate students (one English language learner teacher, one a social studies teacher) and two university teacher education professors (one a physical educator the other a language arts teacher) to ensure consistency. The narratives were then discussed by the whole research team (i.e., the authors of this article) to identify and map out major themes. The specific narratives from each TCs surrounding the themes were also edited for readability and clarity, while keeping TCs' authentic voices and insights as much as possible.

Findings

In the semi-structured interviews surrounding the prompt questions (see Appendix), TCs recounted their experience of composing a dP around their learning in three courses of their teacher education program and shared insights on assessment, technology use and teacher identity. The following six themes and corresponding narratives came from participants of the categories available (+,+; -,+; and -,-): (a) assessment for learning; (b) peer assessment; (c) digital technology learning; (d) interconnected learning; (e) reflection on learning; and (f) teachers' assessment identity. Themes 3, 4, and 5 are focused more on addressing research question one, i.e., learning through dPs, while themes 1, 2, and 6 help to shed more light on research question two, i.e., building teachers' assessment identity through dP processes.

Assessment for Learning

In three of the five courses during the term, TCs experienced assessment processes relatively in line with assessment for learning. In particular, the use of the dP enabled a competency-based curriculum to emerge across these courses where TCs were required to gather and reflect on evidence of their forming teaching identities in relation to the BC competencies for certification standards and the particular focus of the course. In this theme, we unpack TCs' shifting attitudes and insights on their learning processes using assessment for learning practices.

Aria summarized the difference between portfolio assessment and the traditional grade-centered assessment. For Aria, the portfolio assessment is not aimed at getting a better grade as

[I]t is definitely seen as more progressive, and it is not just an average of something. It is looking at it as a whole but kind of looking at where you started, what you worked through and where you have got. So, I really like that it shows progression more than just a final grade.

This idea of personal progress rather than comparison with peers through a number was key to other TCs who also liked the assessment for learning ideas. For example, Bettie found that the dP offered a flexible and personalized approach to assessment. She said,

It is personalized and you could choose to fulfill the criteria (of assignments) however you want, any artifacts that you can relate to teaching standard. The same with the badges². We had a bunch of different ways that we could fulfill, and you choose which technology you want to become competent at or advanced at. It is definitely more flexible.

This multiple paths to success led to choice and therefore personalization of how to be successful contrasted to traditional testing. Mia, however, who was initially more resistant to assessment for learning and digital artifacts, described her experience in dP as an “alternative” assessment.

Our whole course of social studies was assessed through Folioz³. We went to public lectures, related those lectures to the BC curriculum and First People’s principles of learning. We also had to do cross-curricular and reflection, as well as a community engagement activity, which was then related to social studies lessons. We had to post them in Folioz. It’s very different because normally in socials you have to write an essay, or maybe a poster as well.

The introduction of the dP has provided an important place for Mia to reconsider some of her assumptions on assessment as well as what is curriculum and how to show evidence of learning.

Peer Assessment

TCs also practiced giving assessment to peers and used peer feedback to improve their dPs. Although TCs will be assessing and giving feedback to their future students, it seems, from personal conversations with colleagues in the program and with the TCs, that they do not have many opportunities to practice this skill in their teacher education program. The peer assessment and feedback structure embedded in the dP allowed for TCs to learn about peer assessment by engaging in it. Their assessment, in line with Stiggins’s (2005, 2007) guidelines, was not for a grade but rather feedback on how to improve or what they valued in what their peers had presented. This being said, much of their feedback comments are still expressions of approval without much substantial content, which suggests further work is needed with TCs, but the opportunity to challenge and connect their assignments and activities to criteria opened a whole new experience that most of the TCs had never experienced.

Sophie described the effect of peer assessment as follows:

It definitely lit a fire under all of our butts, because it’s embarrassing to have your peer be looking at your portfolio if you’re not doing what you’re supposed to be doing. I think a lot of people were like “oh gosh I have to work on this.” A lot of TCs are like “oh I don’t care if the teacher doesn’t like it, but their peers, they really care what their peers think.”

Olivia expressed a positive view of peer assessment:

² For more details on the use of “badges”, refer to Walker et al. (2017).

³ Folioz refers to an open-source on-line digital portfolio system powered by MAHARA software located at <http://folioz.ca>

I think the peer-to-peer assessment was good. Peer feedback is tough in general because you are friends with these people and you don't want to be really hard. But I do think learning how to give good feedback is important and maybe it could have been a little bit stricter. In general, it was good and the way that I ended up with learning how to use Folioz was through my peers. Some person would know how to use one bit of it and another person would know how to use another part of it. So, you kind of just trade.

Similar comments were made by Bettie about how she learned from peers:

We leaned on each other a lot and especially with the badges and incorporating those in the portfolio. We just got together and sat and figured it out. We would just helped each other because we all kind of knew different little bits of things. When we all came together we could figure it out pretty well. It brought us together.

Carter also commented on learning from each other through the exit interviews. He believed that having two people in the interview process is a good idea because he could assess his work compared to his peer's work in a way that focused on learning not on being better or getting a higher mark. According to Carter,

students can get stuck in their own studies and building up their own portfolios but there has to be some room for being able to see what our colleagues are doing, what they've done and what they've learned because huge part of teaching is developing one's own unique perspective about education.

Therefore, activities such as this portfolio system allowed him the opportunity to see what other people were thinking, with the exit interview being a highlighted focus on learning from each other.

Digital Technology Learning

This theme deals with students' digital technology learning process. One of our findings from previous research as well as prior literature (Hopper, Sanford, Fu, & Monk, 2016) is that digital technology can be a barrier for TCs embracing the use of dPs. However, in this research, we discovered that TCs' attitudes toward digital technology went through a process of change from fear to love by "playing" with their dPs. For those who acknowledged that they were reluctant users of technology, they went through a learning curve outside their comfort zone but succeeded in both acquiring transferable digital technical skills and fully embracing dPs as a learning and assessment process. Bettie shared her experience of a change of attitude over the semester.

I just was not a fan of any kind of technology when I came into the program and that has completely changed. I didn't like the idea of having a digital portfolio just because I had that sort of fear of technology like nothing to do with the portfolio itself; I was just kind of like, oh no it's online and I'm not very good at using things like this, um, but now I absolutely love it because it's such an easy way to just represent everything. You want somebody to know about yourself and it can be creative and change it around as we learn and love having it now.

Acknowledging that she was "bad at technology," Emily felt she was "being thrown into the deep end without water wings," but "really enjoyed it once I started to figure out just the

technology part of it” without the worry of being graded. For Nicole, who was not confident with technology, there was a learning curve in technology, but “through experience and through time it starts to make more sense.” However, as is also acknowledged by Aria, the key is to “play with it,” and “you’ll get there.”

Furthermore, Sophie even began a tech initiative as an assignment in her ed-tech class with her mom who is a teacher of a “different generation” and who hates technology in the classroom.

I told her that we’re gonna make you a YouTube account and start filming your cooking demonstrations, so that your students can access them. It was a bit overwhelming to her, but she actually was quite excited about it after I explained why that could really work and why it could change her attitude towards technology these kids are bringing into the classroom.

It worked out so well and Sophie was able to show the evidence in her dP.

The learning related to technology has also enhanced TCs’ sense of competence, particularly in digital technology. Hailey made the following observation:

through this I was able to actually learn how to invent things, and use different apps and find different platforms that I needed to show the information that I’m proud of and I want to display, but I need access something else to do it. So, working between platforms I thought was really great and that’s something I can take on... beyond just creating an e-portfolio.

Interconnected Learning

In this theme, TCs commented on how dPs, by having everything in one physical place, lays the foundation for something bigger and longer. Specifically, dPs can make connections across subjects, among their peers, and between their teaching and their life. In this way, dPs help them to see the bigger picture of learning to become a teacher and contribute to their growing teacher identity. Two sub-themes: Cross-curricular learning and Personal-professional connections were identified.

Cross-Curricular Learning

Hailey found her dP to be a place where she could go back and check in on what her first reflections were from the first month and see how her understanding had gradually been deepened. She was able to see layers that she was unable to see previously. In other words, her dP laid a foundation for something longer or bigger, through helping her keeping track of the meaningful moments in teaching and in life. For Hailey, it benefitted her learning to teach by making connections and by putting her artifacts somewhere both physically and inter-connectedly.

Nicole also valued her dP as a platform to put her experience together and to share it. She said,

The positive aspect of the whole thing was that it came together with the other classes in the sense that you know the activities are the assignments I had in the classes which weren’t really related to Folioz. I could use them and go, oh yeah, I can use that to describe some things I’ve learned about myself so that was very good for that. It was

connecting the different classes that I've been doing and then being able to have a platform to share that. It was good.

The same feeling that dPs help to make connections across courses was also expressed by Olivia, who talked about how in the technology class she had to create four artifacts and relate them to the BC teaching standards; in social studies she had to do reflections relating her artifacts to the BC teaching standards. In this way, the courses she took all became interrelated, which she regarded as being very good practice. Sophie's story is clear in pointing out the value of this connection:

The first artifact that I chose was my performance of the main solo in UVic chamber music. I was like, well I'm gonna put this on because it's exciting and it's something that I did. And then I realized how we had to link it up. So for me that one really links to having a broad knowledge base and understanding of your own subject area and engaging in career long learning. That learning is coming from being part of the choir performing solo. My confidence from that I can pass on that then benefits my students in the field.

Another story that tells the power of this interconnection is from Mia, who was familiar and comfortable with the more "traditional" type of learning.

When I came into this program, I didn't like comic or graphic novels, thought they were just, like fluff. And now I've learned after taking a course on how to teach English, the value of graphic novels, how they can be great for readers that are not an avid reader like me, and they can be really valuable to also teach things. For example, *Persepolis* is about an Iranian woman during the Iranian Revolution in 1980s and so you know there's so many cool things in that: human rights abuses, government oppression, gender roles, like religious persecution, look there's just so much going on and it's one graphic novel.

Her new insights about graphic novels, demonstrated in her dP, is a clear demonstration of her shifting attitude toward literacy and student learning.

Personal-Professional Connections

Besides connection across subjects and individuals, dPs enable the connection within a single person's personal life and teaching/professional life. Diane recalled that while she was able to talk about her teaching practice, creating her dP also allowed her to think about her passions as well, and what she was interested in general. She was able to connect what she was really passionate about with what she saw in the community lectures that she attended, and with how she would be incorporating those into her teaching.

This connection also happened between the TCs' current program and past experience. In her dP, Aria also included teaching experiences that she had in the past to show where she started. The Teaching of English as a Foreign Language (TEFL) certificate is something she did before the program, so she was able to show that was where she came into the program and that was the knowledge she had, and to work on and expand with the current program. A comment from Emily was particularly powerful, "it (the dP) does allow for you to show yourself as a whole person instead of just specific assignments."

Bettie summarized her view on dPs as seeing a place where TCs communicate things about themselves (i.e., their competency of becoming a teacher, including their teaching style

and beliefs as a teacher and their experiences). For Sophie, the self-awareness of becoming a teacher is very important.

For so many students that self-awareness doesn't always come very easily but when you have a portfolio that you make that focuses on your abilities, all of a sudden, you're looking at yourself and saying oh actually this is valuable; this is a valuable part of me; this is something valuable that I have learned.

This sense of showing something as being of value, not being judged by others or compared to others doing the same tasks, was very powerful to Bettie. She continued saying,

That's really cool, and I think it really contributes to a sense of self-efficacy and so I think just like looking inwardly at yourself and at what is happening there and being able to critically think and also being able to creatively think to form something like a portfolio.

To her, this was a critical step in her being a teacher who could allow her students to find success in their learning.

Reflection on Learning

Most of the TCs (Mia, Bettie, Emily, Olivia, Hailey, and Nicole) pointed out that their dP provided them with a valuable experience in reflecting on their learning, an opportunity that is often emphasized in educational literature, but is often yet to be implemented organically. Bettie found her reflections helped her to have a sense of “hindsight” on her experience.

I was forced to look into the things that I had already done in my life that relate to why I want to be a teacher which was also really useful because it fed into where I want to go. This is a very reflective process actually, more so than you would think just by creating an ePortfolio. I think that having experiences and letting it settle and reflecting on it in hindsight is really useful because you can see where you are... acknowledge what went wrong if something went really wrong, so that you can think about how to fix it in the future. I think that's really important to allow time for reflections after activities are done because that's where all the loose ends get tied up and where everything comes together.

Diane noted,

[f]or each of the field trips we went on I did a reflection on what they are and then connection to teacher competencies. We went on five different field trips... For example, I used a video to show what I learned from this one. I had my Google stuff here we and then for another one I used Voicethread and was able to do a reflection on my learning through Voicethread and add it. Every time I did a reflection on my learning it wasn't just like a written portfolio.

Olivia described her active reflection process with the following comments.

For every artifact I would reflect on the experience, ask myself how did this affect me, how did this affect the people around me, what are the BC teaching standards, does it sort of connect to First Peoples' Principles, so I think the reflection aspect is quite

good ... so when you start it's different. My reflections in September are different from my reflections now and so that's a really positive change.

Mia, having few opportunities to do reflection in her previous learning experience, put her feelings in this way.

I think reflections have been so valuable. When I did an English degree beforehand and a minor in History, we didn't do reflections. And reflections are so valuable because then you're just thinking like right First Nations principle how do I incorporate that BC teacher standard. It's just learning about yourself...you need to know your own world view before you. It was very valuable for the exit interview and for just learning about yourself learning to be a teacher.

Nicole stated her appreciation for reflection enabled by dP in the following words:

If you are going to do it sincerely then, yeah, I think that it helps you bring reflection to your practice and makes you see things perhaps that you wouldn't ordinarily see. So, I mean any moment of reflection is good.

Teachers' Assessment Identity: Imagining Being Professional

TCs came from an array of previous degrees including fine arts, English, math, science and social studies and they commented on how the dP process enabled a different form of learning to become teachers. Particularly, they noted that dPs provided a space to bring their ongoing learning together (a learning hub), which leads to more self-understanding of their emerging teacher identity through the program.

Self-Understanding and Awareness

Several TCs commented on the differences made in learning enabled by dPs as holistic, ongoing, purposeful, self-understanding and self-inspired. Aria commented,

I guess in the sense that you're representing your information in a different way, I was able to represent it in a way that made sense to me through photos or videos or texts or other resources that I brought in...other than just writing a final essay at the end of a course. It was nice to show progress that this is what I've been working on and that you can continuously add to it. It shows that learning has more purpose to it because I'm doing it for myself and we know that it's bettering my own knowledge and it's not just handing in assignments to be looked at by the teacher. For me know I have this great portfolio that really showcases my learning and my abilities, so it's nice to have something that I've created that's important to me.

For Emily,

the idea of the portfolio itself, having students doing this and then everybody has this platform where they can then have the freedom to be assessed in different ways. It's individualized and personalized for each person. I think it's also very beneficial because then you can look at someone say okay maybe you didn't create the same thing as somebody else but it's equally as valuable, creative in a very different way.

Hailey observed, “I'm not ready. I don't know my teaching philosophy hundred-percent yeah, but I'm a lot closer here than I was four months ago and using this (dP) helps guide that path.” But Sophie realized that “I think that it all has to do with understanding yourself and understanding the learning process that you as a person as a student are going through and utilizing that to your best advantage.” She continued,

I think just being self-aware is part of that. For so many students that self-awareness doesn't always come very easily but when you have a portfolio that you make that focuses on your abilities, all the sudden you're looking at yourself and saying actually this is a valuable part of me...really contributes to a sense of self-efficacy and so I think just like looking inwardly at yourself and at what is happening there... and being able to critically think... and also being able to creatively think to form something like a portfolio. I think those are very much intertwined with this whole process. Understanding yourself and your strengths I think is really important. I feel like it can be so easy in a program like this to compare yourselves to other people. It's really nice to have a comprehensive portfolio that says no actually I know all these things.

Thinking as a Professional

Throughout the interviews we observed a shift from a student mindset to a teacher (professional) mindset among the TCs and a recognition that dPs enabled them to develop awareness of their professional knowledge. Emily noted, “The dP not only makes students prepared for their exit interviews (...) where they are to present their learning to experts in the field, but also for future interviews.” Therefore, dPs make them career ready. She continued,

Identity is such a huge thing especially in this time. It's huge but it's something that's not really addressed or you're not having an opportunity like this to say okay Who am I? ... I've never done anything ‘how am I ever gonna get this job.’ I am filling out this job application and bringing in all these different aspects in my life onto this one platform, thinking oh I'm kind of a cool person ... whereas I didn't think that I had something like this to put it on there and see it and then also someone's giving feedback. ‘Wow this is super cool that you did that!!’ and ‘How does this connect to that.’ I think it's a great way for people to access their own identity.

Carter recognized that,

There would be several audiences (for the dP). We could have it for peers, teachers, students in other classes and possibly even parents; right so parents would be able to see that we're doing our job and that we're teaching the students the things that are required in the curriculum. What better evidence can we have than something such as a digital portfolio where the evidence is right there.

Olivia observed,

I just was in an interview with a girl who did it very well and she really got into Folioz. She put everything that she did this semester on it so she had all of her lesson plans, all of her letters of intent, all of her growth mindset reflections that she's done, her teaching reflections, everything that she's done in the semester has been put on there. It's a great source for her to go back and look at and draw upon from when she starts teaching and

then it also shows what you know in interviews, what you're doing, how you're doing it, how you're relating it, how your teaching identity is being developed.

Olivia was so impressed and proud of her colleague, and she felt a common bond, a commitment to being worthwhile teachers. A very revealing comment is made by Nicole, who was identified as (-, -).

It [dP] made me understand different ways of presenting myself and as a teacher and actually I think one of the biggest things it does is that it enables you to create a teacher identity which I didn't really understand I was doing until near the end. I just entered into this program, and you know when you take on a profession you've got your professional identity and now, I'm like, oh this is what it's about; it's like how I'm gonna present myself in the professional world.

Discussion

We feel the evidence from the ten TCs we interviewed demonstrates that they had been going through a transformation process in their understanding of assessment by creating dPs. This transformation can be described, as noted above, as shifting from a “student mindset” to a “professional/teacher mindset”, which can be described in the chart below:

Table 2
Student Mindset to Teacher Mindset

Student Mindset Thinking	Professional/Teacher Mindset Thinking
<ul style="list-style-type: none"> • Doing assignments last minute • struggling with grading criteria • not making connections across courses • waiting for grades from the teacher 	<ul style="list-style-type: none"> • Starting early and playing with the technology • asking questions and helping others • thinking across courses and making connections • learning to give feedback

Specifically, we list below TCs’ changes towards becoming a teacher in the four areas:

- Peer Assessment and Feedback: TCs learn to give feedback and provide assessment for each other. They collectively set standards for their dPs through this process. They develop a growth mindset as a teacher.
- Exit Interview: TCs present learning/competencies to professional educators in the interview and dPs provided an effective platform to facilitate the process. TCs learned to recognize their emerging teacher identity.
- Playing with Technology: TCs learned dP-related technologies by immersing themselves and playing with technology tools. They also taught each other after viewing each other’s dPs. They exemplified a growth mindset as technology learners.
- Reflecting on and Integrating Learning: TCs actively looked back at their learning artifacts via their dP and metacognitively thought about their learning. TCs made connections among courses and their own lived experience as a growing professional.

The following brief story about Mia is a case in point to illustrate this process of “transformation.” At the very beginning of the program, Mia did not understand why she was

expected to create a dP and she found the platform hard to navigate. Moreover, she believed in the value of essays and tests, because “it’s necessary to know for University.” In her previous learning in English and History courses, reflection was not part of the program. However, after a few months into the Teacher Education program, her attitude changed. She found her dP a great way to show to professionals her learning and reflection. In addition, she felt more open to alternative approaches of learning and assessment, such as using graphic novels in language arts and having students upload their work/artifacts that reflect their learning, rather than relying on tests and essays. She saw value in the dP experience in helping her to become a worthwhile teacher for all students.

Conclusion

This research continues the important discussion raised by Looney et al. (2018) of using portfolios in Teacher Education to promote assessment identities in prospective teachers. This study focused on a unique contribution in developing TCs’ assessment identity from experiencing assessment for learning through a dP process. This paper summarizes key insights into TCs’ understanding of assessment in learning to teach and how assessment for learning is implemented in Higher Education. In this research, we present findings from teacher candidates’ narratives that stand as evidence to the holistic and self-determined learning that dPs can afford. Although these TCs started with different attitudes toward dPs and a variety of technology skills, they valued the learning via dPs by the end of the term and they started to perceive their emerging teacher assessment identity through the dP process of collecting, selecting, reflecting, and connecting. We are also mindful, however, that the use of dPs does not automatically lead to TCs’ increasing competency with assessment and teacher identity as effective assessors. As has been shown in prior research, superficial implementation of dPs can result in what Mueller and Bair (2018) call a check-box approach in its creation, last-minute rush to get it done, absence of reflection, and simply another add-on task for overburdened students, which can jeopardize the successful implementation of any kinds of portfolios (Van Tartwijk et al., 2007). For dPs to go beyond being merely a tool, but acting as a teaching and learning strategy, “a substantive shift in the way we view assessment and grades” is required (Mueller & Bair, 2018, p. 9). In this regard, we believe that the potential of dPs cannot be fully achieved without specifically addressing how we view assessment and how we model assessment in higher education.

This research also has implications for educational practice in schools. As noted by the literature review on assessment practices in schools by Fu et al. (2018) there is the need for a close connection between Teacher Education and K-12 education in relation to assessment practices being modelled as well as advocated. The insights from this study can shed light on how this can be done to promote assessment for learning processes repeatedly advocated by scholars (Black et al., 2004; Mentkowski, 2000; Stiggins et al., 2006; Wiliam, 2011) as digital assessments leading to portfolios evidence of learning grow in the K-12 sector. Therefore, as a connected next step of this study, the research team is currently investigating how K-12 teachers are utilizing digital technology for assessment practices that can enhance students’ learning toward achieving curricular competencies. The intent of that study is to feed practicing teacher insights back into teacher education programs, to complete the circle of cultivating teachers who are capable of assessment for learning, and to work with teachers using diverse digital technologies such as dPs.

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Appendix: Interview Prompt Questions

Opening-up questions:

- How would you describe the digital portfolio interview process?
- Can you describe any moments in the interviews that surprised you?

Previous Attitude to Digital Portfolio

1. When you started the PDP program what was your attitude toward creating a digital portfolio?
2. Why do you think you had that perception about using digital technologies? How has that attitude changed or evolved?

Technology and Assessment insights.

3. What was your experience of developing the Digital Portfolio (dP)?

(What did you do to create your dP – stages went through)

(Open up their digital portfolio) - Digital portfolio process in relation to Assessment and Learning

4. How was your Folioz assessed? *Can show me an example.*
5. How did the peer-peer interactions on digital portfolio entries influence your learning and the creation of your digital portfolio pages *(Consider how sharing dPs influenced your learning) Show examples on your digital portfolio.*
6. How does that assessment process in relation to a digital portfolio compare to assessment in other university courses?*(Consider who assessed, what you did in response to feedback and how that influenced your learning)*
7. How do you understand the way you learn through digital portfolio? And, how does this connect to the requirements of the New BC Curriculum *(ask for examples from your portfolio)*
8. So as a teacher, how does doing a digital portfolio inform your understanding of learning and doing assessment?

Teacher Identity

9. How did you select artifacts to go in your digital portfolio?
10. How did the process of reflecting on these artifacts inform your sense of becoming a teacher? *(Consider BC standards to be certified as a teacher, work in class to develop the dP, conversations with the instructor and peers, and the software.)*

Summation

11. Would you recommend doing the digital Portfolio process to a colleague? Why?
12. If you had a digital portfolio system available to use in a school, would you as a teacher use a digital portfolio with your students? Why?