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To cite this article: Kylie Peppler & Anna Keune (2019) "It helps create and enhance a community": Youth motivations for making portfolios, *Mind, Culture, and Activity*, 26:3, 234-248, DOI: [10.1080/10749039.2019.1647546](https://doi.org/10.1080/10749039.2019.1647546)

To link to this article: <https://doi.org/10.1080/10749039.2019.1647546>



Published online: 08 Aug 2019.



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“It helps create and enhance a community”: Youth motivations for making portfolios

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ABSTRACT

Youth portfolios are curated collections of projects that highlight learning across settings over time. Key challenges for harnessing portfolios in broader assessment efforts include the need to better understand what motivates youth to create portfolios and how to leverage these motivations widely. Building on sociocultural approaches, this article presents a qualitative study of youth motivations for portfolios across three US-based school and out-of-school makerspaces. The research identified three themes of youth motivations and how to support them in widespread portfolio assessments: (1) *recognition*, participating in and contributing to communities outside the makerspace; (2) *emulation*, modelling professional work practices; and (3) *exploration*, examining the broader media production pipeline. This work unsettles assumptions of traditional assessment by highlighting the role of capturing episodic engagement to represent youth's roles in society.

Youth portfolios are curated collections of projects or projects-in-progress, documenting the development of skills and knowledge over time and across spaces. Portfolio assessments originated from the historical precedent of art portfolios (Gardner, 1989) and surfaced across US subjects as both a hopeful alternative for standardized testing, which can subsume rich learning experiences to numbers and provide a fuller picture of youth learning (Love, McKean, & Gathercoal, 2004; Niguidula, 1993).

Interest-driven settings – including homes, out-of-school clubs, community centers, and makerspaces – are settings where we see youth voluntarily create and share bodies of work (Keune & Peppler, 2017). However, we know little about young people's motivations for creating such portfolios, the extent to which they align with adult motivations for portfolio assessments, or how to leverage the motivations in widespread portfolio assessments.

A sociocultural approach to motivation (Hickey, 2003; Nolen, Horn, & Ward, 2015), encompassing the factors that drive youth to participate in larger knowledge communities, presents a promising perspective for recognizing why youth capture and sustain their portfolio practices and to identify design principles for leveraging these motivations across portfolio settings. Thus, we asked: (1) What motivates youth to create portfolios in and out of school? (2) What design aspects of portfolios tools can leverage these motivations widely?

To answer these questions, we examined youths' motivations for capturing and sharing in three maker education sites across the United States. These sites were selected due to their high numbers of youth-created and youth-maintained portfolios. We asked 33 focal youth across these sites (18 girls and 15 boys, age 8–16) to show their portfolios – including their favorite projects, how they made them, what they learned, and how and why they captured their work – through semi-

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structured interviews and portfolio walkthroughs. Through iterative coding, we identified three recurring themes of youth motivations for portfolios: (1) *recognition*, participating in and contributing to communities outside the makerspace; (2) *emulation*, modelling professional work practices; and (3) *exploration*, examining the broader media production pipeline. Youth who demonstrated these motivations consistently captured their projects in exceptional ways well beyond the adult-scaffolded instructions for portfolio creation. Thus, following the sociocultural approach to motivation, we analyzed the design features of portfolio tools and practices that mediated these motivations. This paper shares five selected cases to illustrate the identified youth's motivations for portfolios and how portfolio tools can support these motivations for a larger number of youth.

The youth motivations unsettle assumptions of traditional assessment, capturing episodic commitments that represent the youth's role in society. By better understanding youth motivations for portfolio assessments, our aim is to improve portfolio assessments in- and out-of-schools to serve adult *and* youth purposes for portfolio assessment. The implications of this illuminate sociocultural processes of motivation within the context of interest-driven portfolio assessment.

Background and theoretical framework

Youth and making in interest-driven settings

Research on youth motivation overlaps considerably with examinations of interest-driven learning, the type of self-directed learning that occurs when young people research, produce, and form affinity groups around passion areas, often through the use of online tools for capturing and sharing their work beyond their physical communities (Evans, Lopez, Maddox, Drape, & Duke, 2014; Ito et al., 2013; Peppler, 2014). Makerspaces offer significant promise for engaging youth in interest-driven learning due to their emphasis on production and exhibition. Makerspaces are often physical settings where youth explore personally meaningful projects using materials that range from high-tech tools to low-tech prototyping materials (Peppler, Halverson, & Kafai, 2016).

Makers often use digital and online tools for capturing and sharing their work beyond their physical communities. Today's youth are acutely aware of how platforms like YouTube, Reddit, and others can be leveraged to research their interests and engage in dialogue with others who share those interests. Since one of the driving factors for this generation of youth is that they are contributing to something larger in society (Cohen & Kahne, 2011; Kahne & Middaugh, 2012), it comes as little surprise that many youth have an interest in infusing their ideas into public discourse as well as gaining recognition for their contributions. It is at the intersection of designing and sharing a portfolio of work where making produces interest-driven learning communities that are enriched one project at a time (Sheridan et al., 2014).

Portfolio assessment

Initially in response to increased pressure of accountability, the Arts Propel initiative of Project Zero at the Harvard Graduate School of Education initiated portfolio assessment explorations that have driven much of the contemporary standard portfolio practices in US school settings (Gardner, 1989). The portfolio assessment reform movement's primary premise has been and remains to make the richness of learning experiences, knowledge, and skills visible beyond simplistic test scores. The literature suggests multiple consistent benefits of portfolios, including a direct impact on learner achievement (Dorn, 2003; Gipps, 1999) and as effective formative assessment tools (Ewell, 1991). Portfolios can increase students' ownership of learning and responsibility for learning while making it possible to compare and contrast individual students' best achievements and to improve curricular activities through teacher-student conferences (Mills, 1996; Niguidula, 1993). Typical portfolio assessment processes tightly couple instruction and assessment to increase ownership over learning and to position portfolios as learning tools (Lamme & Hysmith, 1991; Love et al., 2004). Traditional

portfolio assessment often culminates in one individual student's personal website, as a narrative that showcases their best work. Portfolios can also be effectively scaled up to larger group assessments (Beattie, 1992) and can be effective in assessing learning that can affect policy decision-making (Dorn, 2003).

Today, there is a rising interest in revisiting the value of portfolios as assessment tools because they provide multiple data points that demonstrate an individual's competency in applying disciplinary knowledge to real-world problems. Furthermore, group portfolio assessments have been shown to help quantify leadership, interpersonal, and communications skills that might not otherwise be available to admissions officers or prospective employers (Keune, Thompson, Peppler, & Chang, 2017). Portfolios in interest-driven learning settings concretize personal relationships to knowledge and learning processes through feedback, narrated curations, and reflections for learners and for their audience. Furthermore, these kinds of assessments promise to show individual, group, project, and organizational learning (Lemke, Lecusay, Cole, & Michalchik, 2015).

A sociocultural approach to motivation

The motivation of learners to document and create portfolios that are shared within and beyond interest-driven settings aligns well with sociocultural approaches to motivation. From this perspective, motivation is seen as the changing factors that support youth to become more engaged participants in knowledge communities (Hickey, 2003). This means that motivational factors are the kinds of practices that are supported by the educational setting as well as resembling practices that professional members of the knowledge community recognize (Hickey & Zuiker, 2005). This approach to motivation shifts the focus of motivation away from the individual to the individual-within-context and motivation shifts from being a construct that is relatively stable and inherently tied to existing interests, goals, and values of a person, towards being a mediator through which participation is propelled into engaged action (Gresalfi, 2009). The value of a sociocultural approach to motivation lies in the possibility for investigating processes of how motivation and propelled engagement comes about and how these productive patterns may inform educational improvement and the design of learning environments (Turner & Nolen, 2015).

To understand how a sociocultural lens can capture patterns of motivation and provide insights for leveraging these across learning environments, Nolen et al. (2015) present a youth's motivation to engage with chess that was motivated by the idea of developing increasing expertise as well as the possibility to interact with people across generations. The authors show that, from a sociocultural perspective, mechanisms and patterns of motivational change are observable. Individuals and contexts cooperatively create learning outcomes, and, therefore, methodologically it is important to study individuals in context in order to understand reasons for actions and outcomes (Järvelä, Volet, & Järvenoja, 2010). The unit of analysis becomes the learner-in-context and their social standing, rather than a person's individual motivations to learn. Recent criticism of motivational research as predominantly conducted by white scholars with white participants calls one to further contextualize the understanding of motivation by taking into consideration the who, where, when, and how in research methodologies (Usher, 2018). This criticism and focus on the collective as well as the context of learning, rather than the person as a holder of motivation, holds transformational possibility because it shifts focus away from fixing deficits to supporting deep engagement.

Here, we build on sociocultural approaches to motivation as a productive guiding frame for researching nuanced reasons for why youth sustain their participation in capturing and sharing interest-driven learning as well as for identifying design principles that may support a wide range of youth to engage in similarly productive ways. The sociocultural frame presents a particularly relevant perspective for investigating under-researched patterns that drive engaged capturing of learning in interest-driven settings. Studying youth portfolio motivations presents a valuable context for better understanding motivational processes of youth with diverse racial and ethnic backgrounds and how these could be leveraged for the design of tools for a broad audience.

Research context and methodology

We conducted a five-year qualitative inquiry of three youth-serving makerspaces in the United States with continuous portfolio efforts, spanning out-of-school, elementary school, and high school settings. To identify these sites, we analyzed the 51 responses to a survey in which we asked makerspace administrators to share information about staff and youth demographics and facilitated portfolio practices. The respondents included schools, libraries, museums, and out-of-school centers. We selected 10 makerspaces with established portfolio practices to understand how portfolios could work across a range of settings. During field site visits, we interviewed educators, spoke with youth, and observed youth as they captured and shared making. Based on this ethnographic survey, we selected three sites for in-depth examination because of the maturity of their portfolio processes. Across all settings, youth had personal websites for documenting projects and processes.

Out-of-school makerspace and portfolio process

The out-of-school space offered programs to youth from age 8 to 18 through summer camps (e.g., 3D printing, digital filmmaking), open-ended programs, and foundational courses. Of the 66 youth members at the time of the study, 35% were female and 65% were male. Among the youth, 54.5% were black, 35% were white, 4.5% were Latinx, 3% were Asian, and 3% were of other racial or ethnic backgrounds. The makerspace began facilitating makerspace-wide digital youth portfolios in early 2014, iteratively refining their process and use of tools. Moving from Evernote, an online journaling tool for creating and sharing notes, to Tackk (no longer functional), an online platform with drag-and-drop, auto-saving, and social media commenting features, the makerspace had implemented a WordPress-based custom portfolio system by the time of our research.

All youth had a personal WordPress website and educators encouraged youth to elaborate on default menu structures while posting regular updates through prompts, including commenting on other members' posts. While initially requiring youth to capture their progress after every session, educators evolved their scaffolding practice by graphing upcoming posts, tracking youth entries, and connecting with individuals who fell behind. As part of the adult scaffolds, the portfolio system also included a launch site where the recent posts of every youth portfolio were displayed in reverse chronological order in a grid-like layout with up to 12 individual portfolios per page. To help scaffold portfolio documentation, the makerspace's portfolio system utilized a backend platform with templates, tips for portfolio entries, and links to adult portfolios for inspiration.

High school makerspace and portfolio process

The high-school makerspace was one of three public schools in its county that offered students (grades 9–12) career and technical education programs. These programs combined core curricular subjects and hands-on activities related to occupational skills, including television production and digital fabrication. Of the approximately 1150 enrolled high school students, 50.2% were female and 49.8% were male. The majority of the students were white (64.4%) with 13.0% Latino(a) and 12.9% black students. Of the students, 32.4% were in the reduced price meal program.

The school facilitated portfolios since 2014. Students documented assignments and work-in-progress on personal Google sites and teachers worked with portfolio templates or designed their own approaches. Google sites organized school years and classes into folders accessible within the school district. To ensure that portfolio practices would prevail, administrators encouraged teachers to develop their own portfolio assessment practices, including the use of open online tools for sharing audiovisual projects on websites that could be accessed outside the district, including Soundcloud, a service for sharing music within a community of artists. Here, educators scaffold

the portfolio creation process by sharing checklists of posts and media production formats students are required to include and prompt about capturing work.

Elementary school makerspace and portfolio process

The elementary school makerspace was one of 13 schools within a charter school network that served students from Kindergarten to grade 5. Of the 410 enrolled students, 48% were female and 52% were male. The majority of the students were Latino(a) (60%), with 18% white, 6% black students, and 16% other racial and/or ethnic background. Of the students, 59% were of low socioeconomic background.

Throughout the school's open areas, student projects were displayed in art installations curated by teachers. One 4th grade teacher extended the school-wide practice of curating student projects by sharing student work online. Using Google sites, every student's portfolio included simple biographical information and pages for reflections on classroom practices and field trips, presentations of goals and how they achieved them, and project-specific pages. To ensure privacy, students were instructed to use nicknames based on their personal interests, to share a drawn self-portrait, and to omit personal information. The capturing and sharing process was highly scaffolded by the educator, who regularly provided instructions on how and when to capture, share, and comment on work-in-progress. This included the provision of sentence starters for students to use when leaving comments for others as a way to foster a culture of sharing and critiquing while also developing familiarity with critique for elementary-age students.

Participants

To study portfolio practices in depth, educators at each site recommended focal youth (18 girls and 15 boys, age 8–16) who deeply engaged in capturing and sharing their work, including unique customization of their portfolios, exceptional use of media files, frequent and sustained engagement, and/or high-profile portfolios (i.e., portfolios that garnered an exceptional number of views compared to other youth at the spaces). Of the 33 focal youth, 9 youth were from the out-of-school site, 13 from the high school, and 11 from the elementary school. Overall, 42.4% were white, 24.2% were black, 15.2% were Latino(a), and 18.2% were of other racial and ethnic background. The selected youth and their portfolios supported the understanding of how portfolios motivate youth to continue to capture and share their work.

Data sources

The data sources included downloads of the youth portfolios and recordings of semi-structured youth interviews. Together, these data sources provided evidence of youth portfolio motivations as well as indications of the kind of portfolio practices and tools/features that afforded and reinforced these motivations.

Youth portfolios

We observed the focal youth's portfolios over time by capturing changes over the course of the research through screenshots and downloads. Screenshots and downloads of one portfolio would cover all separate pages of a youth's portfolio including any displayed images or embedded graphics and written text. This also included youth online documentation that was housed outside of their official makerspace portfolios, but shared with us during the semi-structured interviews (e.g., personal YouTube repositories). The downloads of the portfolios would provide evidence of how features of the portfolio system afforded youth to continue to capture their work.

Semi-structured interviews

We conducted semi-structured interviews with focal youth. During the interviews, we asked youth to open all of their online portfolio pages and to show their work to us, including any makerspace facilitated websites and repository spaces the interviewees may have started on their own. The interviews included three main conversation themes. We requested youth to (1) show us their favorite projects, (2) talk about what they learned while creating these projects, and (3) elaborate on their reasons for documenting their projects. During the interviews, we asked youth to think aloud (Van Someren, Barnard, & Sandberg, 1994) as they shared their work in order to surface retrospective rationalizations of motivations for capturing and sharing in context of their portfolio system. Where applicable, we asked youth to show us their physical projects in the makerspace. Interviews lasted an average of 19 minutes. At the high school, we interviewed two youth together and at the elementary school we interviewed all but one youth in pairs.

Data analysis

Our analysis of the portfolios and semi-structured interviews was guided by a sociocultural approach to motivation (e.g., Hickey, 2003; Nolen et al., 2015). We aimed to better understand the meaning of the portfolio practices within the broader context of the youths' lives in and beyond the makerspaces. Rather than considering how documentation of products and processes communicated an individual's knowledge of disciplinary concepts, we focused on the youth-expressed objectives for capturing and sharing. Further, we wanted to understand how technology mediated youth motivations and sustained their portfolio practice (Blumenfeld et al., 1991).

Analysis of youth portfolio posts

Our first pass at the youth portfolios included reading the content of all entries and annotating the posts in a spreadsheet. The spreadsheet organized information on the location of posts to identify patterns in curation processes (e.g., amount and kind of posts shared on portfolio or blog page), layout changes over time (e.g., changes in images, menus, and fonts), and analytical annotations (e.g., mentioning collaboration, interactions online). Observations of the youth portfolios guided the interview protocol development in relation to characteristic elements of the youth's actual portfolios.

Analysis of semi-structured interviews

We thematically coded the interview transcripts to distill what it was about the portfolios and capturing practices that kept youth coming back. Through iterative coding, guided by underlying assumptions of sociocultural approach to motivation, including patterns that support becoming and fuller member in a knowledge community, we identified three overarching themes to guide the analysis of contextual youth motivations: (1) *Recognition*, participating in and contributing to communities outside the makerspace, (2) *emulation*, modelling professional work practices, and (3) *exploration*, examining the broader media production pipeline. Assumptions of the sociocultural approach to motivation (Cohen & Kahne, 2011; Hickey & Zuiker, 2005) guided us to consider that identifying processes of motivation that sustain youth capturing and sharing in the context of school and out-of-school maker portfolios included youth's engagement with particular features of their portfolio tools in addition to their verbal elaborations. Thus, as a second layer of analysis, subsequent to the transcript analysis, we analyzed the interview video recordings that showed youth pointing at and elaborating on particular aspects of their portfolios and tool interface, in order to track those features of the portfolio system that supported the youth to continue to capture their work. Erickson's (2004) approach to qualitative research guided us to look across entries to characterize design features that linked to the literature-inspired themes. We specifically looked for examples of tool use and interface features that drove and supported the motivations derived from the transcript analysis. Where the verbal elaborations provided reasons for sustained participation from the youth's own retrospective understanding of their engagement, the analysis of the youth pointing to features

provided evidence of how motivation is driven and leveraged by the portfolio tools. Together it can present powerful understanding of processes of motivation in the context of portfolio assessment in school and out-of-school interest-driven settings and point to design recommendations. Lastly, we shared the distilled motivations and youth cases with an advisory group of scholars and practitioners to deepen our analysis.

Findings

Across the makerspaces, the youth consistently captured their work beyond adult mediated practices when the portfolio systems supported *recognition*, *emulation*, and *exploration*. Of all portfolios, 21% included evidence of all three motivations (22% of all out-of-school, 10% of all elementary school, and 31% of all high school makerspace portfolios). All but two portfolios showed evidence of at least one motivation. To illustrate the identified youth motivations and how they supported youth in highlighting their work online, we present five youth and their portfolio practices. Two cases are from the out-of-school makerspace, one from the elementary school, and two from the high school makerspace. We chose these cases because they illustrate how the tools and practices contributed to fostering youth motivations for portfolios and guided design principles that may be leveraged for widespread interest-driven portfolio assessments.

Motivation 1: recognition

For young makers, it was motivating to capture their work when portfolios supported them to contribute to and to be recognized by communities outside the makerspace. Of all 33 portfolios, 57.5% of the viewed portfolios showed evidence of recognition as driving factor of sustained portfolio practices (54% of all out-of-school, 27% of all elementary school, and 54% of all high school makerspace portfolios). Examples included directly addressing an unspecified audience through witty writing, call-outs that aimed to support others to continue trying even after failure, and strategically developing a large following, such as commenting on posts shared by popular social media account holders shortly after posting. Two youth portfolios serve as examples that present how youth used their capturing practice to be recognized beyond the makerspace and how these motivations were made possible through concrete design features (Table 1).

Recognizing the importance that youth placed on participating in online communities that connected them with people who were engaged with similar things, the out-of-school makerspace encouraged youth to share their work on platforms that are commonly used in connection with specific media. One the out-of-school space participants, a 13-year-old named Rapha leveraged a number of sites to showcase his work, citing that he was interested in three forms of production and he was better able to receive inspiration and feedback by targeting these audiences separately. Rapha was in the process of curating portfolios across three sites: A page on *Tinkercad* for his 3D printing designs, a page on *PicsArt*, a social networking site for his graphic design, and a page on the out-of-school's *adult-scaffolded WordPress page* for STEM-related projects he completed at the

Table 1. Motivations and design implications to increase recognition beyond the makerspace.

Youth Motivations: Recognition	Portfolio Design Implications
Participate in online communities outside the makerspace.	Support and encourage the use of popular platforms that youth already use.
See others recognize their projects.	Visualize feedback about portfolio engagement in real time (e.g., likes, views, comments).
Contribute to a larger project and a social cause.	Highlight how individual youth projects speak to larger circulating ideas (e.g., curating and sharing making-of productions).
Explore community, disciplinary, and transdisciplinary connections of projects.	Encourage and support the youth-driven use of several online spaces for sharing (e.g., linking, importing, and embedding projects across accounts).

makerspace. Rapha believed that sharing one's work "helps create and enhance a community" and he stated that "technology and art is where I want to go. And that is why I do this stuff, so I prepare myself for the future." The reciprocal motivation for sharing suggested that he considered sharing a 3D model as a step toward, and perpetuation of, a larger societal cause, and that he assumed others who engaged in similar sharing participated toward the same end. For Rapha, capturing and sharing his work online was a way to anticipate and actively carve out opportunities.

One of Rapha's colleagues, Clara, leveraged existing online communities to advance a broader societal cause: Girls in STEM disciplines. Clara created a public *Facebook* page to "help break the gender gap" (Figure 1). She started a separate page rather than share on her personal profile because she was concerned about oversharing with friends who were not interested in the topic. Clara created a light-up prom dress that integrated a programmed LilyPad Arduino and an LED strip into the dress design. That dress was featured on popular maker-themed blogs and online sites of a youth fashion magazine as an example of a new wave of reimagining engineering and women's roles in technology-related fields.

While some of Clara's projects were prompted by the out-of-school programs, she often went above and beyond expectations, using making as a way to showcase her interests and to inspire others to do the same. Her extended portfolio demonstrated the initiative Clara took to spread her work to a broader audience and to support a cause through her making. This kind of public-facing orientation to making showcases Clara's interest in building communities of girls to connect with and inspire.

Whether sharing their projects to support a social cause or targeting sites for feedback about a particular form of making, both cases indicate the power that a narrative plays in tying together smaller projects (e.g., a digital image) and, in accumulation, speaking to larger ideas. Highlighting and encouraging this can be motivating and a way to sustain capturing and sharing as a long-term



Figure 1. Clara's public-facing social media page.

activity. The use of multiple online tools for capturing and sharing projects allows youth to explore boundaries among communities and disciplines and to see how their projects speak to, disrupt, or intersect these boundaries. Design features to support this can be youth-led mixing and matching of online tools while continuing to track what youth share and where.

It is also worth noting that the prospect of engagement from others appeared to be an motivating factor in terms of where and how often youth shared their work. For instance, aiming to publish one image every day, Rapha uploaded 161 images to his PicsArt design page in five months. At the time of our visit, he had a total of 313 followers, and many of his uploads had garnered thousands of views. Comparatively, on the adult-scaffolded out-of-school WordPress page, Rapha posted 14 entries within one year and neither received comments nor could easily determine if anyone visited or followed the page.

Motivation 2: emulation

For young or novice makers, scaffolding some of their earliest experiences by modelling professional work practices can be highly motivational and can push the boundaries of teachers’ original conceptions of what a portfolio should include. Carving out a personally meaningful and interest-driven space can help them make decisions regarding how and when they publish their work, while fusing portfolio practices learned in school with youth-driven sharing moves they pick up online. Of the total of 33 portfolios, 51.5% portfolios showed evidence of emulation (55% of all out-of-school, 36% of all elementary school, and 61% of all high school makerspace portfolios). Examples of emulation included borrowing language for addressing portfolio audiences from anime blogs, seeking to share walkthroughs of video games youths liked to play on their school portfolios, and combining school media practices with practices observed in popular music videos. We present how youth motivations around this theme were supported through portfolio design features (Table 2).

A youth portfolio case from the elementary school highlights a way in which a young student shared his work in school and out-of-school settings. A 3rd grade student with interests in photography and video games, Mateo captured his work in the elementary school portfolio (Figure 2) – including videos of his goal presentations, Google drawings of field site visits, and monthly reflections – by following his classroom teacher’s instructions. Mateo also used personal social media accounts to share his passion for video games through recordings of himself playing the games. Across both digital portfolio spaces, Mateo brought together the school practices of capturing learning with home culture, including everyday experiences and video game play. Mateo’s capturing was motivated by the possibility of building on his personal interests.

Beyond the elementary school portfolio, on YouTube, Mateo shared video recordings of video game walkthroughs with voiceovers. Since establishing this account, he uploaded seven videos with an average length of six and a half minutes. Mateo’s channel had five subscribers and a total of 78

Table 2. Motivations and design implications for emulating professional production practices.

Youth Motivations: Emulation	Portfolio Design Implications
Explore portfolio practices in a youth-driven account and imagine new projects and ways of sharing.	Model portfolio practices that can be used across spaces for sharing (e.g., privacy, consistent sharing). Foster capturing and sharing at own pace.
Connect with others and see examples.	Support the use of tools that connect youth to people with similar interests (e.g., YouTube video game walkthroughs, embedding Scratch games).
Make personal interests meaningful.	Support ways to reflect on personal interests and to integrate reflection on design processes to meaningfully connect with an audience (e.g., creating sections that are dedicated for sharing process, product, and future plans).
Share personal interests with others as an economic means.	Introduce youth to a range of portfolio features and platforms that could professionalize their making (e.g., YouTube advertisement, Etsy stores).

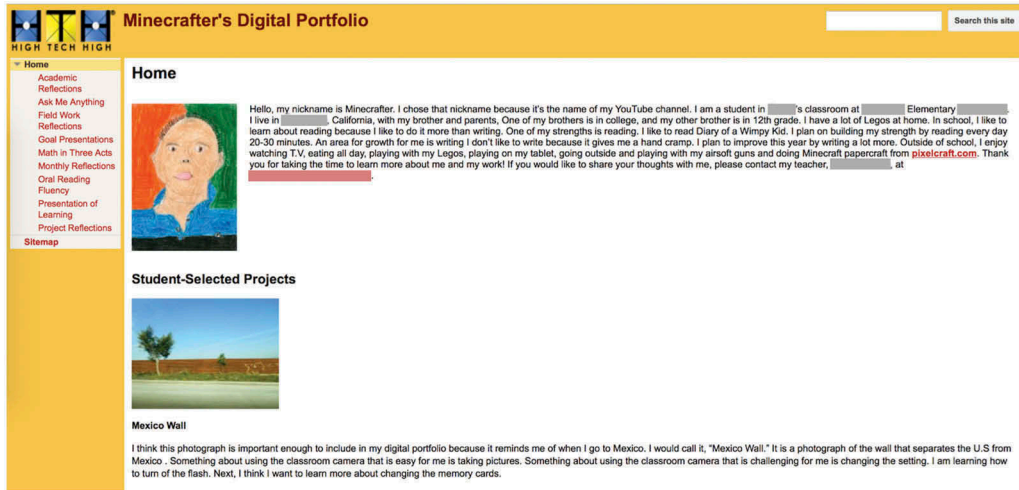


Figure 2. Mateo's elementary school portfolio homepage.

views. Mateo told us that he viewed video game walkthroughs by others, and in his own videos, he comparatively referenced other channels.

We observed that Mateo internalized and adopted the common practices of active YouTube personalities. In several videos, Mateo directly addressed the audience using phrases that are common to the genre, such as anticipating comments (e.g., “I know what you guys are going to say in the comments”), greeting and signing off (e.g., “Hope you enjoyed the video. Peace out.”), and editing the video to erase irrelevant aspects and to introduce humor (e.g., “So right now, I am going to cut out a bunch of footage as I am making stone so you guys don’t have to watch me. I’ll be right back – Guys, I am back.”).

The recording of the videos is a generative practice, as it inspired Mateo to think up additional recordings he could produce (e.g., a “fails video”) and alternative ways of producing them. Another aspect of Mateo’s YouTube portfolio is related to sharing videos and gathering views and subscribers in order to make money. He shared with us:

Yeah, I put ads on them because that’s how – That’s like the main reason. That’s how you make money. (...) you advertise things and so they pay you. They pay you a few cents when you put them, but they pay you more when people actually click on them.

Through the advertisement feature on YouTube, Mateo was aiming to utilize his personal interests and portfolio to earn money. He was aware of the mechanisms around how raising money through views works. He further told us that he learned how to implement ads on his videos by watching instructional videos. Mateo also explored other ways to gather viewers, including leaving comments on his own videos to start a discussion.

Through experimentation, Mateo also became aware of the policies and practices related to intellectual property rights and their effects on openly sharing media online. Mateo mentioned that he did not overlay his walkthroughs with commercial songs to avoid being flagged or removed from the site. The sharing on the site provided Mateo with an opportunity to learn about the complexities of copyright and the potential repercussions that violations would have on his own YouTube account and, by extension, his anticipated income.

In this case, Mateo appeared motivated by exploring portfolio practices in a youth-driven account and imagining new projects and ways of sharing. Furthermore, he was motivated by the possibility to connect with authentic audiences that shared examples of the kind of work he was interested in and could emulate. The way in which he was able to interact with this audience afforded Mateo the

ability to integrate reflections on his design process in his final product as he connected with his audience, rather than his reflections being a separate aspect of his work disconnected from an immediate purpose.

Lastly, Mateo was motivated to further develop his portfolio through the possibility of turning the sharing of personal interests into an economic opportunity by supporting the use of features and platforms that could professionalize his making. Across the board, the capturing and sharing of work within school-based and out-of-school-based portfolios supported Mateo in meaningfully integrating his school learning with something he deeply cared about and was personally driven to do.

Motivation 3: exploration

Many youth we spoke to were motivated by how their making is connected to their exploration of the broader media production pipeline, including post-production and cross-platform sharing, particularly those interested in the arts. Exploring these forms of sharing supported youth to understand social implications of sharing. In total, 66% of all viewed portfolios showed evidence of exploration (69% of all high school, 55% of all elementary school, and 78% of all out-of-school makerspace portfolios). Examples of how youths shared their work and the social implications the way of sharing had included maintaining social media multiple accounts and observing how areas of interest remained separate or converged as well as recognizing ambient information such as patterns of the academic year or bedtime routines of classmates by observing portfolio entry meta-data. Furthermore, when makerspaces encourage youth to explore how artistic interests can be presented in different ways through the possibility of setting up multiple accounts, youth become motivated to explore sharing in the open and sharing semi-privately in connection with a larger collaborative effort, such as a maker collective or a band. Similarly, maintaining accounts associated to groups and individuals is a way for youth to choose how they'd like to engage with an online space and how openly to share their work.

In the following, we present cases of youth using their portfolios to practice what it might be like to be part of a production process and what this might entail for broader practices related to digital citizenship (Table 3).

Two youth portfolio cases from the high school makerspace illustrate how youth took ownership of the portfolio process. Myriam, a 10th-grade student passionate about digital music production, shared her original compositions on Soundcloud and YouTube, a common practice for most of today's recording artists. A challenge in the showcasing of her work was the often-collaborative nature of many of her productions, with her role in its creation – as musician, lyricist, songwriter, or co-writer – shifting from track to track.

Myriam has two Soundcloud accounts, one personal and one shared account for her band, which intersect in interesting ways. For example, Myriam uploaded a song to her personal account that was later reposted by the shared account. While Myriam explained that the song was not created by herself alone, the way in which it was shared on the personal account attributed the composition to

Table 3. Motivations and design implications for exploring new roles.

Youth Motivations: Exploration	Design Implications
Explore the complexity of the media production pipeline.	Support multiple accounts in professional online spaces (e.g., group and individual accounts with the same platform).
Experiment with sharing both in the open and semi-privately.	Facilitate the exploration of privacy settings and attributions (e.g., possibility to specify contributor credit and to link posted projects across group and individual accounts).
Be recognized as a responsible member of society.	Advocate for and amplify youth voices through transmedia productions that contain the makerspace brand (e.g., highlighting youth work across institutional accounts, showing institutional logos in the portfolio).
Highlight the professional skills of all collaborators.	Support a range of modes to augment a project's message (e.g., music video for a song).

her. Without access to her additional explanation, the collaborative nature of the production and how Myriam and others divided responsibilities in the creative process were neither visible on her personal nor her band portfolio.

For Myriam, this wasn't a matter of taking or ceding ownership. Instead, the two accounts provided Myriam with the possibility of exploring and negotiating the nuances and social implications of representing songs as part of her solo-artistic explorations or as part of a shared project. This can open up questions related to copyright, attribution, and possibly the invisible work it takes to be "internet-famous." In Myriam's case, having more than one online account on the same platform for similar kinds of creative projects facilitated the exploration of these cross-cutting conundrums.

One of Myriam's classmates, Connor, also captured his creative projects across multiple online platforms that supported different media types. A senior in high school interested in rapping and producing, he sought to increase the exposure of his tracks by posting his compositions to Soundcloud, which was cross-linked to his YouTube page for music videos and accompanying "behind-the-scenes" supplementary material (Figure 3). Connor further disseminated links to both platforms via Twitter.

A driving force within Connor's work was commentary on current events. In one track addressing police brutality, Connor interlaced video footage of national newscasts as well as an excerpt of a speech by President Obama into his rap verses. Framing artistic media production as an empowering way to make his voice heard, Connor took a critical and democratic stance that was purposefully directed toward showing himself as a responsible member of society.

Connor's message was that media production that is openly shared online can make voices heard that were previously not. The audience he sought to reach lay beyond the school; Connor aimed to reach people outside high school who were interested in finding a way to express themselves and their messages. Educators at the high school supported his efforts by sharing and re-sharing posts by Connor or about Connor's work. The high school's academic counselor, the athletic director, the school's basketball team, and school district administrators linked to his work, praised his creative production, and shared selfies with Connor while he live-mixed event music. These two cases indicate that youth were motivated to document when the documentation tools afforded them recognition as responsible members of society (e.g., Connor's critical and democratic stance) and to highlight professional skills of all collaborators as a way to differentiate their skills and contributions (e.g., Myriam's shared and personal accounts). The chosen tools supported a range of modes to augment a project's message (e.g., audio recording and music video for a song). Uploading and sharing with multiple tools and different types of media supported a range of modes through which messages of one medium could be under-scored and new messages could be layered onto the initial production.

When the school acted similar to a music label by advertising artists, they amplified the youth's roles in society and highlighted the school's role in the production of such students. Advocating for youth voices and highlighting youth work via social media recognized youth efforts and their contributions to a larger community. Together, this afforded youth the opportunity to explore their musical identities in the open while at the same time keeping one foot in the safe, monitored makerspace.

Discussion and implications

The cases illustrate how youth were motivated to work on their portfolios, particularly when their work was recognized outside the makerspace. This helped youth explore new roles beyond the makerspace and emulate professional production processes while being connected to the security of the local setting. In out-of-school environments where participation is voluntary, this meant identifying ways to make portfolio creation immediately meaningful. At the high school makerspace, youth were motivated to document making when portfolios supported them to try out who they could be beyond school, including exploring copyright implications and different ways of sharing. Lastly, at the elementary school, where youth might first be introduced to sharing work online, they



Figure 3. Connor's digital portfolio across social media accounts.

were motivated to capture their work in ways that strengthened connections across learning environments and to share when they could practice adult-driven portfolio principles while simultaneously earning money.

All of the portfolios highlighted here are variations of site-specific leveraging of portfolio software and practices. The variety shows how vastly different or similar individual portfolios can be in relation to the system and practice. Looking across the variety of portfolios and analyzing the motivational patterns and features that fostered engagement to capture and share can inform the design of portfolio practices and tools that support youth in making portfolio creation immediately meaningful to their learning.

Where youth's media-production interest may more easily lend itself to access to professional examples, other areas of interests might be less transparent outside of the makerspace. There is a need to consider how these youth motivations may be leveraged for engagement with professional examples more equitably across diverging interests.

Our work shows that sociocultural perspectives on motivation can highlight motivational factors that unsettle assumptions of traditional portfolio assessment. First, interest-driven learning is not limited to one location; learning can happen across multiple workstations and sites. This means that tools and practices for capturing learning experiences need to be ubiquitous, mobile, and linked across online and offline spaces. The networked tools used by the youth in the spaces we observed fostered recognition beyond the makerspace rather than steering portfolios toward defined audiences. Second, as youth work on projects, capturing and sharing iterations and insights can disrupt engagement. To avoid such interruptions, portfolio practices need to be tightly coupled with the task at hand. Third, learning outcomes in interest-driven learning settings can develop over time rather than being defined at the beginning. Youth do not have to have everything worked out from the start. Portfolios support the possibility for youth to capture their work on an ongoing basis online in ways that highlight and value engagement that would otherwise be overlooked. This is particularly important for youth who traditionally do not have a positive and high quality record of their work and engagement online. Lastly, in interest-driven settings, where learners collaborate and are inspired by each other's work, portfolio practices need to build on emergent youth motivations to contribute to the growing learning community instead of primarily serving as a tool for comparing learners. The cross-site, episodic, and collaborative engagement is advancing assessment approaches as continued yet sporadic sharing contrasts to the typical backward design approach to assessment. Portfolios can produce counter value and lead to transformations. To make this possible, the unique set of characteristics of interest-driven learning settings, whether school or out-of-school maker-spaces, needs to be considered when adapting portfolio practices for capturing learning.

Acknowledgments

This work was supported by the Gordon and Betty Moore Foundation under Grant #066917-00002B awarded to Maker Ed and Kylie Peppler. Any opinions, findings, and conclusions or recommendations expressed in this article are not those of the Gordon and Betty Moore Foundation. We thank the Maker Ed, especially Stephanie Chang, and the maker educators and students we worked with throughout the research.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Gordon and Betty Moore Foundation under Grant #066917-00002B.

Data availability statement

The data of this study can be made available upon request. The Institutional Review Board at Indiana University approved this study. Informed consent was obtained from all adult and youth participants and youth guardians. Pseudonyms were used for individuals.

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