





# Connected learning ecologies as an emerging opportunity through Cosplay

Los entornos de aprendizaje conectado como oportunidad emergente mediante el Cosplay

 Sophia Bender is Graduate Research Assistant in the Learning Sciences Department at the Indiana University's School of Education in Bloomington in Indiana (USA) (sobender@iu.edu) (<https://orcid.org/0000-0001-8039-4414>)  
 Dr. Kylie Pepler is Associate Professor in the Informatics and School of Education at the University of California in Irvine (USA) (kpepler@gmail.com) (<https://orcid.org/0000-0002-5472-4974>)

## ABSTRACT

Connected learning explains how people can build learning pathways that connect their interests, relationships, and formal learning to lead toward future opportunities such as careers. However, most learning systems are not set up ideally for connected learning; for instance, most schools still teach disciplines as discrete units that do not connect to students' interests outside of school. We do not yet know enough about the structure of naturally occurring connected learning ecologies that do connect youth learning across contexts and help them follow pathways toward careers and other desired outcomes. Learning more about what works well on these pathways will allow us to design connected learning environments to help more youth have access to these desired opportunities. This paper analyzes two case studies of cosplayers –hobbyists who make their own costumes of media characters to wear at fan conventions– who benefited from well-developed connected learning ecologies. Cases were drawn from a larger interview study and analyzed as compelling examples of connected learning. Important themes that emerged included relationships with and sponsorship by caring others; unique pathways that start with a difficult challenge; economic opportunities related to cosplay; and comparisons with formal school experiences. This has implications for how we can design connected learning ecologies that support all learners on unique pathways toward fulfilling futures.

## RESUMEN

El aprendizaje conectado explica cómo las personas pueden construir rutas de aprendizaje conectadas a sus intereses, sus relaciones y al aprendizaje formal que lleven a oportunidades de futuro en una carrera profesional. Sin embargo, la mayoría de los sistemas de aprendizaje no están diseñados para una experiencia de aprendizaje conectado. Por ejemplo, casi todas las escuelas siguen enseñando asignaturas como unidades cerradas que no conectan con los intereses de los alumnos fuera de la escuela. Todavía no sabemos lo suficiente sobre la estructura de los ambientes naturales de aprendizaje conectado que sí activan la experiencia de aprendizaje con diferentes contextos y llevan a los alumnos hacia un camino de crecimiento. Aprender más sobre lo que funciona en estas rutas de aprendizaje nos permitirá diseñar entornos de aprendizaje conectado para ayudar a más jóvenes a obtener los resultados deseados. El presente trabajo analiza dos casos prácticos de «cosplayers» –aficionados que crean sus propios disfraces de personajes ficticios y los llevan a convenciones y eventos– que se beneficiaron de entornos de aprendizaje conectado correctamente desarrollados. Aspectos importantes que surgieron en el estudio incluyen las relaciones con el apoyo y cuidado de y hacia los otros: dos caminos únicos que comienzan con un difícil desafío: las oportunidades económicas derivadas del cosplay y las comparaciones con otras experiencias escolares formales. Todo ello afecta la manera de diseñar entornos de aprendizaje conectado que apoyen a todos los alumnos en sus caminos únicos hacia el futuro.

## KEYWORDS | PALABRAS CLAVE

Connected learning, cosplay, learning trajectories, lifelong learning, participatory culture, case study, qualitative analysis, cultural studies.

Aprendizaje conectado, cosplay, trayectorias de aprendizaje, aprendizaje permanente, cultura participativa, estudio de caso, análisis cualitativo, estudios culturales.



## 1. Introduction

Learning researchers have long studied learning that takes place in authentic communities outside of schools, whether that be apprenticeships of tailors and midwives (Lave & Wenger, 1991) or rocket-building hobbyists (Azevedo, 2011). The learning that takes place within the context of extracurricular interests and hobbies is not always valued in the wider society; however, it is often viewed as less important than school learning (Lave, 2011), even when these engagements lead to additional learning opportunities and are sometimes the main way that young people learn about modern media (Barron, 2010; Jenkins, Purushotma, Weigel, Clinton, & Robison, 2006).

Connected learning (Ito & al., 2013) provides a framework that helps to conceptualize learning related to youths' interests and relationships with others in a way that connects to future-oriented opportunities like school, higher education, careers, and political clout. However, we know very little about how learners navigate these pathways in ways that could inform the future design of learning environments. While the connected learning pathways of youth have been studied (Ito & al., 2013; Barron, 2010), we know much less about those of adults who have successfully built on their passions toward meaningful, lasting career opportunity. One way to learn more about this is to turn to retrospective case studies (Maltese & Tai, 2010) to gather adults' histories of what worked well for them, so this can be applied to the intentional design of connected learning environments.

Cosplay (Bender, 2017) –the depiction of characters from media properties through costumes and roleplay (thus the portmanteau “cosplay”), usually at fan events like conventions– provides a case of how learning can be connected to future opportunity. As part of this hobby, cosplayers are motivated to pursue their interests, learn numerous skills, connect with mentors and networks, and enrich their experience of life. Sometimes they are fortunate enough that they are able to navigate pathways toward career opportunities that are relevant to cosplay. In these cases, cosplayers have benefited from a successfully connected learning ecology. However, the system is not always set up to legitimize the skills they are learning in their hobby, connect their school learning to it or broker career opportunities related to their skills. By looking at differences between positive connected learning in cosplay and contrasting examples of disconnected learning in schools, we may glean insights into how we can redesign learning ecologies at all levels to support unique pathways toward future opportunity for all learners, especially those who have been systematically disenfranchised by lack of access to resources or sponsors who can legitimize their out-of-school interests.

In investigating the perspectives of cosplayers on their practice, we ask: What sorts of learning pathways exist in cosplay? How can this hobby connect cosplayers to future opportunities? How can we make it –and learning ecologies in general– work better for those who do not experience connections between their extracurricular interests and future opportunities? Interviews with two cosplayers provided particularly positive examples of connected learning: with caring adults acting as sponsors and providers of resources, both were able to follow pathways toward careers relevant to their hobby, and they continue to pursue life opportunities like freelance work and mentorship of others that enrich their lives and connect to their hobby.

### 1.1. Connected learning

In a networked, digital world, today's youth need ways to connect the networks, interests, and skills they are building both on and offline, in and out of school, to sites of opportunity. Legitimizing the interests and experiences of youth will help all youth to tread their own unique paths. In their 2013 report, Ito, Salen, and Sefton-Green introduced the framework of “connected learning” to describe and explain phenomena that connect various spheres of learning in a synergistic way that leads to future opportunities. Since then, Ito and others (2013) have been editing a new report that reformulates some aspects of the framework. At the time of this writing, the updated framework puts a new emphasis on connected learning environments as not only being interest-driven and participatory but also following the principles of being “production-centered”, organized around a “shared purpose”, and inclusive of opportunities for “sponsorship” and “pathway building” for youth. The new report also describes how connected learning environments thrive at the intersection of three spheres: “relationships” (e.g. with peers, family, and mentors), “interests” (e.g., in fandom), and “opportunity” (expanding beyond the original report's focus on “academics” to include careers, political enfranchisement, etc.).

Each of these contributes uniquely to an environment that connects and legitimizes learning between different settings throughout the lifespan. Interest tends to provide the spark that leads to long-term engagement in connected learning activities (Hidi & Renninger, 2006). Production helps encourage active learning as young people make, share, remix, and reflect on artifacts (Papert, 1980). A shared purpose ensures community cohesion as everyone

works toward common goals, regardless of age or other demographic differences. Relationships with peers provide a context important to youth, and relationships, in general, are important for building a shared purpose. Sponsorship, in particular, whether by providing resources or opportunities to delve further into an interest, is a special sort of relationship that will be explored further in the data. Sponsors help provide access to pathways that let youth explore interests and move toward opportunities for positive outcomes in academics, careers, and life enrichment in general. Each of these spheres and principles is applied to the context of cosplay below.

### 1.2. Why study pathways?

Many connected learning scholars call for studying learning pathways (Barron, 2010; Kumpulainen & Sefton-Green, 2014) to help us better understand the way learning works over the long-term (“learning lives”), and because short-term learning interventions do little good when systemic barriers prevent youth from pursuing a fulfilling future (Philip, Bang, & Jackson, 2017).

This calls for studying how youth learn skills that are applicable to future goals, how mentors broker opportunities for them, and how we can facilitate this for all youth. An enriching life should be the goal of all education, going beyond the walls of the school into people’s futures as contributing members of society (Bell, Bricker, Reeve, Zimmerman, & Tzou, 2013 for another perspective on studying learning pathways). This is why a connected learning framework that reaches beyond the school day to connect it to young people’s hobbies, home lives, and jobs is particularly well suited for the study of learning pathways.

**Connected learning describes learning related to youths’ interests and relationships with others in a way that connects to future-oriented opportunities like school, higher education, careers, and political clout. While the connected learning pathways of youth have been studied, we know much less about those of adults who have successfully built on their passions toward meaningful, lasting career opportunity. Studying them can help us derive principles for designing connected learning ecologies that work well for all youth.**

Some similar previous work has traced the paths of youth through “technobiographies” of their interest-driven, outside-of-school engagements with technology (Barron, 2010), but this work is limited to youth and possibilities for future economic opportunities, rather than adults who have achieved these opportunities. Barron, Gomez, Pinkard, and Martin (2014) reported on the Digital Youth Network, an attempt to cultivate a connected learning ecology, and traced how youth within the program became proficient with new media over time and across settings, but this also focused on youth. The original connected learning report (Ito & al., 2013) also traced the paths of several young people to illustrate examples of connected learning, but except for one, these were all youth as well. A recent survey operationalized the connected learning spheres and principles as did the present study, in order to measure youths’ experiences with connected learning, but it was again limited to youth (Maul & al., 2017). Bell and others (2013) traced STEM-related learning pathways of youth through in-depth ethnographies, identifying ways that youth engaged in STEM, such as learning about biology through health-related behaviors, over time in various settings. While this study went a long way in legitimizing youths’ outside-of-school STEM-related activity and how it connects across settings, it again focused on youth. A gap remains in tracing the paths of adults from their youthful engagement in interests, supported by relationships and sponsors, toward opportunities such as careers.

Maltese and Tai (2010) interviewed 116 graduate students and scientists to determine the experiences that sparked their interest in science. Like the present study, this research involved interviewing adults to determine retrospectively the experiences that set them on their current path toward science careers. However, it did not trace their entire path, and it focused only on science.

Recent work also tells us that most coordinators of youth-serving programs conceptualize ways for youth to connect to more advanced opportunities within their programs, rather than between programs (Akiva, Kehoe, &

Schunn, 2017), implying that we need more examples of how caring adults can help youth connect interests and opportunities between settings. An analysis of connected learning pathways that led to favorable outcomes can help provide the guidance these youth-serving organizations are seeking.

### 1.3. Cosplay: Connected learning in action

Cosplayers vary greatly in their engagement, from those that create “closet” cosplays from combinations of ordinary clothes that could be found in a closet, to those that buy professionally made costumes, to those that make their own from scratch. They could copy a character’s outfit exactly as it appears on TV, in a movie, video game, comic, etc., or they might design an alternate version of the outfit, such as “steampunk”, a faux-Victorian aesthetic complete with trinkets that look like they are “steam-powered”. Most cosplayers wear their costumes to fan conventions (“cons”), where they can pose for pictures, meet other fans cosplaying from the same fandom, shop for goods from their favorite fandoms, and attend panels celebrating geeky topics. In this sense, cosplay is a participatory culture that both celebrates media as it is and “poaches” and reinterprets it through wearing costumes that allow fans to be the characters (Jenkins, 2012). Like other participatory cultures, cosplay is open to creative participation by all who are interested, it supports creation and sharing, it involves informal mentorship either in person or through online tutorials/resources, members believe their creations matter, and members have a social connection with each other (Jenkins & al., 2006). These all help to support the learning process in cosplay, which is robust as it is in other participatory cultures (Jenkins & al., 2006).

Cosplay fits in well with a connected learning framework, especially for those who follow a pathway involving learning how to make their costumes. It may start from an “interest” in fandom or from “relationships” with friends who wish to put together a cosplay group at a con. The skills developed and relationships built both online and offline can provide “pathways” toward “opportunities”, such as design skills applicable to a career, or meeting people who may become future business clients. Since cosplay is an expensive hobby, “sponsorship” is important, and many young cosplayers rely on parents and other caring adults to financially sponsor their first forays into cosplay by paying for materials, con attendance, etc. Sometimes these adults also provide lessons in skills needed for cosplay, like sewing or sculpting. Otherwise, cosplayers can build their pathways through online resources such as tutorials, demonstrations, and online discussion groups where they can ask questions and receive advice. The “shared purpose” of the cosplay community –to make or otherwise acquire costumes of characters to wear at fun events like cons– means that members of the community are willing to help and welcome each other, both online and in person at cons. This is a “production-centered” practice because of the production of costumes and performances “in character”.

However, not every cosplayer manages to access economic and enfranchisement opportunities through their hobby. Most environments are not set up to allow such access, even if it is desired. So while cosplay, in general, is successful at connecting interests and learning, we must study exceptional cases that also connect to economic opportunities if we wish to find principles for pathway design that can lead all youth toward such opportunities.

In approaching this research, we were guided by the following questions: What sorts of learning pathways exist in cosplay? How can this hobby connect cosplayers to future opportunities? How can we make it –and learning ecologies in general– work better for those who do not experience connections between their extracurricular interests and future opportunities?

## 2. Material and methods

To explore cosplayers’ pathways, the lead author was situated as an embedded ethnographer in the cosplay community as part of a research project on the math inherent in textile crafts funded by the National Science Foundation in the United States (Peppler & Gresalfi, 2014). After obtaining informed consent, ten cosplayers participating in regional fan conventions were interviewed, using a semi-structured interview protocol that asked how the participants had learned the skills needed for cosplay, what drove them to participate in this hobby, stories about particular projects, and how online and in-person communities were involved in their practice. Throughout each interview, cosplayers discussed their experiences with their current occupation, and with school, particularly focusing on math classes because of the larger math-related research project. The interview protocol was intended to determine aspects of the community and craft context that led to learning of crafts (in this case, the craft of cosplay), as well as to contrast math used in crafts with math used in school. While the interview did not ask about connected learning principles specifically, it is perhaps unsurprising that they emerged from discussions of interest-

driven hobbies, relationships with a community, and academic and occupational opportunities.

The cosplayers were interviewed individually, except for one case in which three cosplayers spoke with the interviewer at the same time. Interviews took place in person, over the phone, or via video conference and lasted approximately 45 minutes to an hour. Two interviewees were male, and eight were female. They were selected through a process of convenience sampling—cosplayers the interviewer knew personally—that led to snowball sampling—friends of the first wave of cosplayers. They ranged in age from 21 to 33 at the time of the interview, and all were White Americans living in the United States.

All interviews were transcribed and reviewed by the lead author in order to identify cases of compelling connected learning pathways. In analyzing the interviews, we found that the cosplayers described cosplay as a worthwhile force in their lives and described thorough learning pathways of how they learned to cosplay and continued to engage in their hobby. For many of the cosplayers, their hobby remained disconnected from any economic opportunities like their careers. Two interviews stood out as exceptional cases of connections between cosplay and careers, from which design insights for connected learning pathways could be gleaned. These acted as models of positive deviance (Pascale, Sternin, & Sternin, 2010) and extreme cases (Flyvbjerg, 2006) that, among all the interviews, provided the most information and suggestions for how a well-developed connected learning model could be scaled, such as showing how cosplay could lead to economic opportunities. The other interviews either did not show direct connections between cosplay and careers, or, in one case, was missing crucial details due to time constraints placed on the interview. Extreme cases often provide the richest information about how a phenomenon works and thus are justified for inclusion (Flyvbjerg, 2006). This was the case here.

Interviews were split into analytically relevant chunks (usually a sentence or a few sentences on the same topic). Each chunk was inputted into Microsoft Excel and coded a priori according to the connected learning spheres and principles; then the data was further consolidated into themes. The coding remained open to emerging themes. Each code is described in Table 1 below.

In addition to the connected learning framework-related codes, another theme emerged related to the discussion of disciplinary topics traditionally taught in schools (e.g., math). Those instances that mentioned disciplinary learning were sub-coded as “connected” or “disconnected” to interests, projects, etc., depending on how the interviewee discussed it.

Codes were combined into themes detailed in Results below, and anecdotes and quotes related to the themes were drawn from the interviewees’ reports to illustrate design principles for making learning pathways more connected to interests, relationships, and opportunities.

**Table 1. Codes applied to the interview cases**

<b>Codes: Connected Learning Spheres</b>	
Relationships	When family, friends, mentors, on- and offline community members, or others who played a role in their cosplay experiences were mentioned. It often overlapped with “sponsorship” and “shared purpose”.
Interests	Anything engaging the interviewees' interests, including anything they called “fun”.
Opportunity	Academic (e.g., college majors) and economic (e.g., jobs or freelance work) opportunities
<b>Codes: Connected Learning Principles</b>	
Pathway building	Anytime interviewees mentioned something they did to build skills (or that demonstrates their current skill) along their cosplay pathway. It often overlapped with “production-centered” and “opportunity” because opportunities are parts of pathways.
Shared purpose	Whenever doing something with others, such as a cosplay group; often overlapped with “relationships”.
Production-centered	Working on a specific project, as well as when they had something to say about the benefits of making something
Sponsorship	Whenever someone helped the interviewees do something that they could not do on their own, or the interviewee acted as someone helping others; often overlapped with “relationships”.
<b>Emerging Code: Disciplinary Learning</b>	
Math, literacy	Mentions of a disciplinary topic traditionally taught in schools, such as math; sub-coded as “connected” when related to, for instance, a cosplay project, and as “disconnected” when decontextualized and school-bound only.



### 3. Results

The following presents a summary of each of the two cosplay cases, followed by the themes derived from the coding of the interviews.

#### 3.1. Introducing connected cosplay cases

Lexi (all names are pseudonyms) had been cosplaying for nine years and was 31 at the time of the interview. With her artist mother as a sponsor of learning new craft skills and her friends encouraging her to join their cosplay group, Lexi dove right into the hobby with a costume that was a big challenge to sew. Now, she uses the knowledge she gained about clothing from cosplay in her job for a large intimate-wear company. She continues to seek opportunities to express fashion creatively through designing for local fashion shows and freelance fashion consulting work. Lexi often cosplays from video games she enjoys, and almost always cosplays with a group of friends from the same series, such as when she cosplayed from the TV show “Avatar: The Last Airbender” and also helped to make costumes from the same show for non-sewers in her group. She almost always cosplays male characters, partly because it makes it less likely for men to show a romantic interest in her. As a woman who has been in a committed relationship with another woman for many years, this is a desirable outcome but also allows her to play with gender in ways she enjoys. See Figure 1 for an example of Kuja, a male video game character Lexi has cosplayed. Kuja wears a revealing costume, and Lexi delightfully reported receiving confused reactions about her gender when wearing this cosplay. For her, cosplay is “just kind of nice to step outside of yourself for a bit”.

Tim’s interest in entertainment design was supported early by his enrollment in a performing arts middle and high school that he now, at 33 during the interview, works for as a sculpture teacher. Like Lexi, he began to cosplay in order to join friends at fan conventions and to express his love for particular characters. Now he is paying forward the sponsorship he received, and is encouraging others’ interests in art and cosplay; he lets students bring cosplay projects into his class, sometimes even brings his own to class, and allows friends to use his studio at home to work on cosplay and learn techniques from him. He is well accomplished at both sewing and prop design. Figure 1 shows one of Tim’s cosplays, that of Captain Harlock, a character from various TV shows and movies, including “Space Pirate Captain Harlock”. Tim has always loved this character, ever since he first encountered him in one of the first animes he ever watched. He described Harlock as “dark” and “mysterious” and went into great detail about how he made this “dream” costume, from molding Harlock’s gun out of silicone to attaching snaps to the cape so it will



Figure 1. Lexi as Kuja from Final Fantasy IX (left) and Tim as Captain Harlock from “Space Pirate Captain Harlock” and other works (right).

not tear. He also described the costume as “never finished”, detailing his plans to add an animatronic bird to it, to represent Harlock’s pet parrot. His passion for cosplay manifests as a continuous challenge to himself.

Results of the analysis of the two cases showed that while all aspects of the connected learning framework played a role in the participants’ paths, relationships (particularly peers and sponsors), challenging

starts, and economic and enriching opportunities were particularly strong themes. Both interviewees also discussed math classes as a disconnected experience that contrasted with their experience of learning how to cosplay.

## 3.2. Themes

### 3.2.1. Caring others: Friends, family, sponsors

As a combination of the codes of “relationships”, “shared purpose”, and “sponsorship”, this theme emerged as very common in the data and was consequential in motivating initial and continued engagement in cosplay. Both Lexi and Tim, like most cosplayers, got into the hobby because friends wanted them to join their cosplay group at conventions, so their relationships with peers who also shared their interests provided initial motivation. Shared interests in a fandom and the shared purpose of celebrating those interests at conventions were also catalysts for making new friends. As Tim put it, “There’s a big difference in cosplay by yourself and cosplay in a big group. It is so much more fun... Whenever you have like two or three people, and then you are like, ‘Oh hey, you are from our show,’ you grab them, and they spend the day with you; like, you are making friends the whole time”. Peers are vital to the lives of youth and young adults, and cosplayers are no exception.

Sponsorship by caring adults (Barron, Martin, Takeuchi, & Fithian, 2009) played an important role too. In Lexi’s case, her mother is an artist who always encouraged her, growing up, to learn new skills by doing, and is the one who gave Lexi her first sewing machine when she expressed interest in sewing her cosplays. Later, Lexi received sponsorship and legitimization of her interests from the realm of formal education in her Human-Computer Interaction (HCI) master’s program, where she learned how to integrate electronics into clothing. Tim received sponsorship from formal education as well, such as when he attended a performing arts school for middle and high school, where he learned costume design for theatre, and his undergraduate program in Entertainment Design, where he learned skills like resin-cast molding that he can use to make cosplay props. Beyond these formal routes, both cosplayers learned a great deal from online sources and in-person mentors.

### 3.2.2. Pathways: Starting big

“Pathway building” was the most common code, but an interesting finding emerged in terms of how cosplay pathways tended to begin. While all ten cosplayers followed unique pathways, a common theme that emerged across most of the interviews was that of taking on huge challenges early in the process of becoming a cosplayer. For instance, the first costume Lexi ever sewed involved sewing bias tape along the curves of an underbust corset-like garment. It was not easy; she said, “If you are ever wanting to learn how to sew, don’t do bias taping on a curve”. She was motivated to take on this challenge because she wanted to join her friends’ group of steampunk-style characters from the video game “Final Fantasy VIII”. She says she has not backed down from a challenge ever since: “I kind of started on a hard one and kind of haven’t stopped since then. Literally every time I make something, I learn something new about how to sew”.

Tim, as well, took on challenges that were beyond what his skill level “should” have been. For the first cosplay he wore at a convention, he chose a version of his character’s costume that was not very popular among cosplayers, meaning he had fewer online resources to draw from in order to figure out how to make it. Though he had a great deal of formal training in costume design for theatre, cosplay turned out to be altogether different, and he engaged in trial-and-error to develop skills needed to complete his cosplays. Now he is expert enough that he can make his own sewing patterns and tell how to construct a costume just by looking at it.

### 3.2.3. Opportunities: Beyond school and jobs

While a less frequent code, “opportunities” helped identify the two cases as outstanding because of the way both Lexi and Tim use skills they learned in cosplay in their jobs and opportunities outside their careers. Lexi continues to learn a great deal about clothing in her job for the digital division of a well-known brand of intimate-wear. However, she gets to do more creative work outside of her job, such as designing a line of interactive, electronically-enhanced clothing for a local fashion show. She does freelance fashion consulting, and her cosplay and fashion design work allow her to get her name on the map for potential clients. This allows her to be a sponsor for others by sharing her knowledge of creative clothing design.

Tim is a sculpture teacher at the same performing arts school he attended as a child. He regularly incorporates cosplay props into his classroom both by bringing in his own and letting students bring in theirs. This sponsorship of others’ interest in cosplay is one of his passions; he hopes to one day establish a permanent cosplay studio in his

hometown where cosplayers can gather for lessons and collaborative work. He already takes a leadership role in organizing social events for his local cosplay community as well as volunteering for the local anime convention.

#### 3.2.4. Disconnected learning: A contrast

This code emerged from the data, largely from the interview's occasional focus on math. Many interviewees –not just the cosplayers– in the larger research project expressed dissatisfaction with their experience with math classes. Lexi and Tim were no exception. Lexi struggled with the highly theoretical math classes she took as part of her undergraduate program in aerospace engineering, saying she would have preferred applications to concrete contexts. She said these math classes “had no basis in reality... It was completely based in a weird surreality that certain people enjoy and I'm not terribly fond of”. In contrast, she said math in cosplay is applied directly to the project the cosplayer is working on.

This study used the connected learning framework to analyze the hobby of cosplay – creating and wearing costumes of media characters at fan events. Two cosplayers were selected from among ten interviews as compelling cases of connected learning pathways leading to cosplay-relevant careers. Analyses of the interviews showed the important role of caring others, starting with a large challenge, economic opportunities inside and outside of schools and careers, and school learning related to interests rather than disconnected from youths' concerns.

Most of Tim's experiences with math classes seemed similarly disconnected from his interests. He lamented that math is not often taught in a way that connects to topics of relevance to students' lives, contrasting a problem about a train needing to coordinate speed with schedules and passenger numbers, with a problem that involved his interest in cosplay: how could he appropriately budget to buy materials for multiple costumes. It seems that people who have experienced connected learning can recognize how disconnected traditional school learning tends to be.

#### 4. Discussion and conclusion

The data addressed our research questions by showing us how Tim and Lexi's unique learning pathways in cosplay worked well for them, how their hobby connected to economic opportunities both within and outside careers, and how we can design for connected learning that works well for all learners. Tim and Lexi's experiences with cosplay learning pathways led to positive outcomes primarily because they connected to important aspects of their lives, as the connected learning framework would suggest. Relationships with peers motivated their initial engagement, and adult sponsors provided access to materials and skills, whether in person or online. They both began their cosplay journeys with a challenge that “should” have been beyond their current skill levels, but they managed it and continued to challenge themselves. This contrasts with conventional views of learning as following a step-by-step trajectory from easier to more difficult, suggesting that when appropriately motivated, learners will surmount challenges “beyond their level”. Both cosplayers were also fortunate to be able to apply their cosplay experiences to their careers, but they also felt a sense of fulfillment from opportunities beyond their careers in which they could sponsor others' interests in cosplay and clothing. Finally, they both recognized how disconnected their math classes had been from their lives and contrasted that with the way math in cosplay did connect to their interests and goals, suggesting that school should do the same.

These findings help validate the emerging updated connected learning framework's focus on opportunities in general rather than on “academics” only. Tim and Lexi's careers and outside-career economic opportunities were important results of their connected learning pathways that would have been missed with an exclusive focus on school. Additionally, this work shows the value of tracing the pathways of adults, in order to see how opportunities play out successfully and how we can help all learners access similarly successful pathways. These cases also help



to show the variety of meaningful opportunities that can exist, beyond both school and careers. Future work on connected learning should take all this into account.

To create a more effective connected learning system that values all learners' interests and skills, and orients them toward economic and political opportunities, these cosplayers show us that we need to 1) Legitimize learners' interests rather than dismiss them as frivolous. 2) Support their relationships with peers as positive motivators. 3) Act as sponsors who provide access to skills and resources. 4) Support youths' goals even if they seem beyond their current skill level. 5) Recognize opportunities both inside and outside of careers as ways to enhance creative expression and meaningful relationships with others. Considering how disconnected most traditional schooling is from the rest of youths' lives, these cosplayers also suggest that 6) School learning should be applied to contexts that matter to students' interests and future plans.

One way schools have been integrating interest-driven learning into the curriculum is through the growing trend of makerspaces (Wardrip & Brahm, 2016). By providing space and materials for the open-ended making of student-choice projects, schools can sponsor students' interests, whatever they might be, while students develop production-centered design skills that could be applicable to future opportunities. With a makerspace, a school does not have to be centered on arts like Tim's was in order to support student interests, nor will students have to wait for graduate school as Lexi did, before learning an interesting hands-on topic like e-fashion. If provided with the proper resources and sponsorship, students could even work on cosplay in a school makerspace, and perhaps set out on a path from there toward a career, just like Tim and Lexi. Even if the makerspace or other interest-driven activity is outside of school, schools could still provide legitimization by, for instance, giving class credit or taking it into account in college applications.

Only when we create supports for unique pathways both in and out of school, throughout the lifespan, will equitable connected learning be accessible to all.

## Notes

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