"Ever wondered what schizophrenia was?": Students' digital storytelling about mental disorders

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ABSTRACT
Digital storytelling is a short form of multimedia production that can foster digital literacy and facilitate subject matter learning. This study describes how middle school students learned
about mental health by composing digital stories, showing how this also influenced their attitudes toward mental health in their own lives. Using a qualitative multiple-case method, we
explored three immigrant students' digital storytelling in a psychology class. We use a visual grammar derived from systemic functional linguistics to analyze their digital stories, examining representational, relational, configurational, and social functions. Our analysis shows how students chose design elements to reflect their learning about and reactions to mental illness. We analyze how students projected relationships with the audience and how these projected relationships both reflected and influenced their learning and personal development. We conclude that digital storytelling can be an excellent pedagogical tool that allows students to engage both in subject matter learning and self-reflection.

KEYWORDS
Middle school, bilingual learners, digital storytelling

INTRODUCTION

In America's increasingly diverse classrooms, teachers must meet the needs of students from heterogeneous backgrounds. Immigrant students, and many children of immigrants, face challenges due to linguistic and cultural differences. In this article, we focus on how teachers can better address one particular challenge that immigrant students face. Many cultures stigmatize mental health disorders, which makes it difficult for people to seek help. How can teachers serve students from these cultural backgrounds, being respectful of their beliefs while also helping them to see the realities of mental health disorders and the positive potential of mental health treatment? We show how teachers can use the educational technology of digital storytelling to help immigrant students learn about mental health.

Ever since YouTube began, people have been generating vast amounts of digital content. Every day, millions compose slide shows, digital brochures, videos, web sites, podcasts, blogs, and other digital content. Much of this content is used for entertainment, but it also has substantial potential for education. Digital storytelling is one popular format, one which teachers can use to help students learn subject matter and also address personal challenges. By *digital storytelling* we mean 2-to-5-minute multimedia movies that combine visuals such as pictures, images, animation, text, and audio like music and narrative voiceover (Kim & Li, 2020). Digital storytelling facilitates personal expression and is a versatile tool for teaching and learning. Through this modern expression of the art of storytelling, students can learn about new areas, develop their own voice, and engage with otherwise difficult issues (Rule, 2010).

Recently, digital storytelling has become a popular tool for teachers in the K-12 classroom (Kingsley et.al, 2019; Niemi & Multisilta, 2015; Yang & Wu, 2012). Nilsson (2010), for example, describes a 9-year boy with reading and writing challenges who used the narrative and multimodal affordances of digital storytelling to develop his own voice and become more deeply engaged in learning. Angay-Crowder, Choi and Yi (2013) analyzed a summer program for multilingual middle school students, concluding that a digital storytelling curriculum "can be particularly powerful for multilingual adolescents as it permits them to reflect on and recreate their multilingual and multicultural lives and identities " (p. 44). Digital storytelling has been found to enhance subject matter learning because it offers students an alternative, multimodal pathway for meaning-making (Honeyford, 2013; Lantolf, 2000; Swain, Kinnear, & Steinman, 2015).

Digital storytelling can be particularly useful with subject matter that connects to students' own experiences and requires deep involvement. It can provide opportunities for students to explore subject matter that has particular meaning or might otherwise be difficult. In this study, we explore first- and second-generation immigrant middle school students learning about mental health using digital stories. Mental health can be difficult to teach about, because the subject can be upsetting and threatening, especially to adolescents, and especially to students from cultures where mental illness is not typically talked about. Digital stories, as a medium, allow middle school students to learn, express themselves, and articulate their own

voices, and we show how this can facilitate their engagement with curriculum about mental health. It would thus be useful for beginning teachers to have digital storytelling as one pedagogical tool that can benefit immigrant students.

TEACHING MENTAL HEALTH THROUGH DIGITAL STORYTELLING

As a teaching and learning tool, digital stories extend the genre of personal narrative. Lambert (2013) described them as an expressive form available to anyone and offers comprehensive guidelines for how teachers can use them. Robin (2019) showed how digital stories can be used to inform and instruct, cataloging 10 elements of digital-story composition: (a) the overall purpose of the story; (b) the narrator's point of view; (c) a dramatic question or questions; (d) the choice of content; (e) clarity of voice; (f) the pacing of the narrative; (g) the use of a meaningful audio soundtrack; (h) the quality of the images, video, and other multimedia elements; (i) economy of story detail; and (j) good grammar and language use. By attending to these different dimensions and scaffolding students' work on them, teachers can take advantage of the power digital stories can have for facilitating student learning and engagement.

Teachers sometimes design digital-story assignments for English-as-a-second-language (ESL) classes and immigrant students (Angay-Crowder, Choi, & Yi, 2013; Emert, 2014; Green, Inan, & Maushak, 2014; Honeyford, 2013). Prior research has documented how student-driven digital-story projects can be effective and engaging for English language learners. Green et al. (2014), for example, documented how the integration of student-generated videos into ESL classrooms can encourage language production. Skinner and Hagood (2008) described a digital-story project that allows students to explore, express, and reflect on the evolution of their sociocultural identities and individual lives. Most studies of English language learners, however, focus on students' language and identity development and not on their acquisition of subject matter knowledge.

Children of immigrants face acculturation challenges and disproportionate suffering from mental disorders (Caballero et al., 2017). Some also come from cultures and societies in which mental health is rarely discussed. Learning about mental disorders can be crucial for these students, helping them to be aware of their own mental health, to understand the causes of disorders, and to manage their own and others' mental health problems more effectively. Despite various programs on social-emotional skills, positive self-image, and behavioral adjustments (Sklad, Diekstra, De Ritter, & Ben, 2012), most middle schools do not offer psychology courses. In high schools, psychology courses are usually designed to help students enter psychology majors in universities (Ernest & Petrossian, 1996). This is unfortunate, particularly for immigrant students facing challenging situations or dealing with trauma, because psychology could facilitate self-understanding and perhaps reduce stress. Since such

courses are so rarely offered, there is no research on how to integrate digital storytelling to help immigrant students learn psychology.

Employing digital stories in psychology courses could increase students' awareness of mental disorders and provide content-specific knowledge. Furthermore, multimodal formats like digital stories that involve modes of meaning making and representation (Baldry & Thibault, 2006) can provide English language learners various forms of access, thus overcoming some of the linguistic disadvantages that they face in monolingual classrooms. This study explores one classroom in which English language learners were given an opportunity to learn about the psychology of mental health through digital stories.

In addition to describing this unusual teaching of mental health content to middle schoolers using digital stories, we also implement an innovative approach to analyzing digital stories as data. Digital stories are challenging, complex objects for empirical analysis, because they include several modalities that work together (Baldry & Thibault, 2006). They represent "a different system of signification" (Honeyford, 2013, p. 17), one that not only supports students' comprehension but also empowers them to research, experience, and imagine (Castañeda, 2013). The complexity of this medium creates methodological challenges. In response, we have designed a framework to analyze digital stories, drawing on contemporary work in systemic functional linguistics and related fields (Jewitt, 2009; Kress and van Leeuwen, 2006; Martinec and Salway, 2005; Painter, Martin, & Unsworth, 2013; Unsworth, 2001). We apply this framework to analyzing how middle school students used digital storytelling to understand subject matter in mental health, asking the following questions:

1. How do middle school students from immigrant families experience learning about mental health through digital stories?

2. What are middle school students' design choices while composing digital stories?

3. How do middle school students articulate their understandings of and attitudes about mental health through digital stories?

METHODS

Employing qualitative multiple-case methods (Merriam, 2009), we explored three immigrant students' digital storytelling experiences in a psychology class. We also examined their use of visual grammar in composing their digital stories, adopting a systemic functional linguistic approach to understand the resources that they used (Kress & van Leeuwen, 2006; Painter et al., 2013; Serafini, 2015; Unsworth, 2001).

The Capstone Program

St. Corus School (a pseudonym) is a private Catholic school in the northeastern United States. About 40% of students come from immigrant families. We gathered data in a 3-week capstone program. This program offered sixth and seventh grade students' a choice among six subjects: psychology, arts, science/engineering, career, math in cooking, and virtual reality. Psychology

was the most popular subject. This program used project-based learning (PBL), engaging students in realistic projects related to the subject matter (Gülbahar & Tinmaz, 2006). Each psychology student chose one mental disorder among the many options offered by the teacher and conducted research. Students created a short digital story to introduce their concept to others and to demonstrate their understanding of it. Ms. Bora (a pseudonym), the school counselor, led the psychology project. A researcher worked closely with the teacher and the students to help with the projects, and also took observation notes.

The procedure for developing the program included five steps:

1. Planning: Teachers and research team members met and developed a central question and detailed plans for each project, focusing on how the subject matter connected to students' interests and experiences. Students signed up for one of 6 subjects: psychology, arts, science/engineering, career, math in cooking, and virtual reality.

2. Training: The research team leader conducted a digital storytelling workshop for teachers. The workshop focused on definitions of and methods for composing digital stories. The steps include 1) the place of stories in our lives, 2) digital storytelling, 3) the story circle, 4) scripting and storyboarding, 5) assembling the story, and 6) sharing and celebration.

3. Fieldtrip: Ms. Bora took a fieldtrip with students to a women's hospital to learn about mental health issues.

4. Composition: Each student composed a digital story. Students used VoiceThread or WeVideo to compose digital stories on the topics they chose (i.e., depression, bipolar disorder, and schizophrenia).

5. Sharing and celebration: Students shared their digital stories and provided feedback to each other.

Students

Seven students (all female) participated in the psychology capstone project. We purposefully selected (Merriam, 2009) three of them to participate in the study (see Table 1). All were first- or second-generation immigrant students. They volunteered for the study and signed consent forms.

Table 1

Demographic Information of Participants

	Grade	Born in	First language	Home language	Technology	Digital story topic
Molly	7	US	English	Swahili & English	VoiceThread	Bipolar disorder
Jenny	6	China	Chinese	Chinese	VoiceThread	Depression
Kate	7	US	Spanish	Spanish	WeVideo	Schizophrenia

Molly, Explorer

Molly was an African American seventh grader born in the United States. Her parents immigrated from Kenya and speak Swahili at home. She understands Swahili, but she did not speak it well. Molly was a Snapchat, Instagram, and Google slides and docs user, but never a video maker. In this project, she used VoiceThread to present her topic, and she enjoyed the freedom of choice afforded her while composing her story about "Bipolar disorder."

Jenny, Critical User

Jenny was a sixth grader who came from China to live with her father in the United States three years prior to this study. Her mother was still in China. She learned to use VoiceThread to complete a project on "Depression." She regularly used Instagram, Snapchat, and YouTube on her phone, and she often used a Chromebook and Google Drive for her schoolwork. She was a skillful user of technological tools.

Kate, Avid User

Kate, a U.S.-born seventh grader, spoke Spanish at home and learned English as a second language. Kate's parents were immigrants from Bolivia. She was an experienced video editor, often editing video and posting on YouTube. Kate considered herself technology savvy. She was comfortable using a variety of digital visual tools, including iMovie, Filmora, PicMonkey, WeVideo, and VoiceThread. For this project, she chose WeVideo to introduce "Schizophrenia."

Data Collection

We collected four kinds of data during the 3-week year-end capstone project period in spring 2017. Our goal was to understand how teachers can use digital storytelling to engage diverse students with personally challenging subject matter. We collected data using 1) observation, 2) two semi-structured interviews, 3) digital stories, and 4) researchers' journals.

1) *Observations:* As a participant observer, a research team member observed the entire implementation period for 3 weeks and took detailed observation notes.
2) *Two semi-structured interviews:* We asked open-ended, semi-structured interview questions about three topics at the end of the program: (a) background information; (b) design choices for each slide; and (c) reflection and future considerations.

3) *Digital stories:* All students created a digital story in the program using tools of each student's choice, and we analyzed their final products.

4) *Researcher's journals:* The observer wrote a researcher's journal, which included students' performances and class activities and elaborated the observation notes in detail. The researcher also wrote in her reflective journal after every class session during the research period.

Data Analysis

In order to explore students' experiences and learn about students' design choices, we performed two types of data analysis: qualitative case-study analysis and multimodal analysis. To answer Research Question 1, we analyzed interview data, observations, and the researcher's reflective journals using a qualitative multiple-case method. We followed three steps. First, we analyzed the data using coding categories derived from the literature (e.g., project-based, experience, composition of digital stories, etc.) as well as inductive open coding (Lincoln & Guba, 1985) -- creating new codes like, for example, eye contact, anxiety, relationships.

Second, we did axial coding, in which related codes are put into subcategories (e.g., choices of images, audio and visual relationships) and then combined to form new thematic categories (e.g., representational, interpersonal, compositional, and sociocultural aspects). We reviewed emerging concepts and clustered them with similar concepts. Third, we compared new themes across the three students. For example, we calculated the number of "everyday" images used by the three students to see if this kind of image was commonly adopted.

To answer Research Questions 2 and 3, we analyzed students' digital stories and the interview data. We have developed a systematic approach to analyzing digital stories. We build on Unsworth's (2001) analysis of multimodal texts, which is based on Halliday's (2014) systemic functional linguistic analysis. We modified the framework so that it applies to digital stories. We focus on four functions of the signs used in digital stories: representational, relational, configurational, and sociocultural (Kim & Li, 2020). *Representational* structures verbally and visually present the nature of events, the objects and participants involved, and the circumstances in which they occur. *Relational signs* communicate the nature of relationships among speakers and listeners, writers and readers, and viewers and the viewed, as well as among participants in visual representations. *Configurational meanings* are concerned with the distribution of information among elements of the text, images, and audio elements. Drawing on Serafini (2015), we included a *sociocultural* function as well. This includes the author's personal background and the social context, as these are represented in multimodal artifacts, including the sociocultural contexts that led to the author's subjective views. Table 2 presents our comprehensive analytical framework for digital stories.

Table 2

Analytical Framework for Digital Stories

Construct	Multimodal element	Elements of Construct
Representational	Visual: Everyday images Technical images Audio (non-linguistic) Written language Oral language	
Relational	Contact	Demand Offer
	Social distance	Close-up Medium Long-shot
Configurational	Information zone	Left–right Top–bottom Center–margin
	Salience	Size Color
	Audio–visual relationship	Elaboration Extension Projection Enhancement
Sociocultural construct		Context History Values Politics

We applied our analytical framework to the students' digital stories, attending to various types of signs (visuals, audio, texts), developing a detailed analysis of their digital-story compositions. First, we analyzed the students' digital stories by breaking them into slides, sorting them for patterns, and coding them based on our framework. We also incorporated Maton and Doran's (2017) distinction between *everyday* and *technical* images, to understand the connection between a multimodal artifact and its sociocultural background, as well as Martinec and Salway's (2005) insights into text–image relationships (See Table 2).

With respect to the first function, we examined representational communication in the digital stories, focusing on four modes: visual, nonlinguistic audio, written language, and oral language (See Table 3). Within the visual mode, we divided the various images into kinds: (a)

everyday images, where "meanings are not given by their location within such specialized domains but rather through their usage in commonplace practices and contexts" (Maton & Doran, 2017, p. 58); (b) technical images, where "meanings are given by their location within a specialized domain of social practice" (Maton & Doran, 2017, p. 58). For example, in the students' work, we sorted everyday images into four main categories: field trips, real people and objects, cartoon figures, and symbolic icons that are commonly used in daily life. Technical images are, for example, those used to illustrate academic or professional topics. We also reviewed the audio. Audio consists of voiceover (a form of oral text) and music (nonlinguistic audio; See Table 4). Additionally, we reviewed written language (e.g., text), and oral language (e.g., voiceover). We explore how students "verbally and visually construct the nature of events, the objects, and the circumstances in which they occur" (Unsworth, 2001, p. 18).

Table 3

A Map to Understand Representational Constructs

Visual	Everyday images	Image of the students' field trips (taken by the author)
		Images with real people and objects (downloaded from online)
		Images with cartoon figures (downloaded from online)
		Images with symbolic icons (downloaded from online)
	Technical images	Images specifically for academic/professional use (downloaded from online)
Audio (nonlinguistic)	Background music	
Written language	Written texts	
Oral language	Voiceover/oral script	

Second, we explored relational communication (See Table 4). We examined the demand and offer functions of images for social contact, as well as the exposure of characters or animals for social distance. According to Unsworth (2001), demands often involve the straight gaze of participants toward viewers, while offers exist mostly in nonhuman, human-like, or animal images and leave no room for imaginary interpersonal relationships. Unsworth (2001) also identifies three levels of social distance: (a) close-up shows viewers only the face and shoulders of a person; (b) medium depicts a character from the waist up; and (c) long shots present the whole-body image of people, suggesting more distance.

Table 4

A Map to Understand Relational Constructs

Contact	Demand	A straight gaze of participants toward viewers
	Offer	Nonhuman, human-like, or animal images, with no gaze toward participants
Social distance	Close-up	Show the person's face/head and shoulders, intimate/very personal
	Medium	Show the person from waist up, socially interactive
	Long-shot	Present the whole-body image of people, suggesting more distance.

Third, we explored the configurational dimensions of the digital stories (See Table 5). Signs within a text relate to each other, such that "all elements of a multimodal text are associated with the other visual and verbal aspects of the ensemble and affect how meaning is represented and constructed" (Serafini, 2015, p. 417). We focused on students' design choices about information zones, salience, and audio-visual relationships (See Table 5). Information zones depict the positions of different visual elements on the screen and the meaningful relationships achieved through visual structuring. In this case study, we categorized information-zone choices mainly into three types: left–right, top–bottom, and center–margin, which signal given and new, ideal and real, nucleus and subordination, respectively (Unsworth, 2001). Salience entails the use of size or color and contrast to demonstrate importance (Serafini, 2015). We also analyzed students' voiceovers together with the visuals to examine how students made decisions on inter-modality (Unsworth, 2001).

Martinec and Salway (2005) provide a framework to understand relationships between visual and audio signs, emphasizing how "content that has been represented by text or images is re-represented in the other mode" (Martinec & Salway, 2005, p. 349). The framework identifies *projection*, in which textual or visual content is re-represented in other modes, and *expansion,* in which non-linguistic relations are created between represented events. *Expansion* can be divided into three kinds: 1) *elaboration* deals with the levels of generality of the text and the image, examining whether one or the other is more general; 2) *extension* involves the addition of new, related information in either the text or the image and resulting changes in the relationship between the image and a text.; 3) *enhancement* refers to the qualification that one text or image does to the other (Martinec and Salway, 2005).

Table 5

A Map to Understand Configurational Functions

Information zone	Left-right	Left: more familiar information *(given)*
		Right: new information (*new*)
	Top-bottom	Top: more generalized, conceptual information (*ideal*)
		Bottom: more concrete, specific information (*real*)
	Center-margin	The Center: the nucleus of information (*central*)
		The Margins: subordinate to/dependent on the Center (*peripheral*);
Salience	Size	Importance or a hierarchy of importance
	Color	Importance or a hierarchy of importance
Audio-visual relationship	Projection	Text or image content re-represented in other modes;
	Expansion	Non-linguistic relations between represented events;

Table 6

Projection and Expansion (Martinec & Salway, 2005)

Projection		"Content that has been represented by text or images is re-represented in the other mode" (Martinec & Salway, 2005, p. 349).
Expansion	Elaboration	Exposition: "the image and the text are of same level of generality" (Martinec & Salway, 2005, p. 350).
		Exemplification: "the image and the text have different levels of generality: either the text or image can be more general" (Martinec & Salway, 2005, p. 350).
	Extension	"A relationship between an image and a text in which either the one or the other add new, related information" (Martinec & Salway, 2005, p. 350).
	Enhancement	"When an image and a text are related by enhancement, one qualifies the other circumstantially" (Martinec & Salway, 2005, p. 350).

Fourth, we also investigated social contexts (Serafini, 2015). Students created their projects in social context, reflecting certain values and norms. To better understand their

meaning-making processes, we analyzed authors as social, cultural, and political beings. For example, all participants were immigrants or the children of immigrants. They brought with them understandings drawn in significant part from their own or their parents' home cultures. We examined their stories, trying to understand whether and how their social positions influenced their points of view. This allowed us to address a central objective of the study: exploring how digital storytelling can help teachers address the challenges faced by students from immigrant families.

FINDINGS

In this paper we focus on one type of student diversity and one type of pedagogical task for beginning teachers: helping teachers use technology to engage students from immigrant families with the challenging subject matter of mental health. In the classroom we described, the teacher was able to use digital storytelling to engage students productively with mental health issues. In order to see how she did that, we will analyze each of the stories using the analytical framework introduced above. We organize our findings according to the four functions of *representational, relational, configurational, and social*. For each function, we first describe how students made design choices. Our analysis of the digital stories shows how the students made intentional choices of different design elements, in order to reflect their learning about and reactions to the mental disorders. For each function, we also analyze how students projected certain kinds of relationships with the audience. We show how the diverse students' design choices both influenced and reflected their learning and personal engagement with the challenging issues in the curriculum.

Choices about Representational Meanings

Molly's Story

Molly's story was about bipolar disorder. In her four-and-a-half-minute video, she talked about the definition, the symptoms, the diagnosis, and the illness in children, and she added detail from two of her field-trip experiences. Molly effectively used her field-trip photos in her psychology project. For example, their trip to the Women's Center at a local university (Image 1) helped her learn. She described "how [the university] advises the women there and helps them in their time of need." She also related her experience with therapeutic drawing (Image 2) for the treatment of bipolar disorder: "the art therapy was helpful because in each disorder that I think we had, therapy was a type of way that helps them. I learned that art therapy could be a useful tip for people with bipolar disorder." In Slide 6 (Image 3), Molly included a photo of her observing and assisting a younger child in a kindergarten art class, and she explained the genetic and environmental causes of bipolar disorder in her voiceover. She made this image choice because it shows how art can be used to calm children and prevent them from being negatively affected by distracting stimuli in the environment.

Molly also chose cartoon images with symbolic icons intentionally, as an implicit representation of psychological concepts. Slide 3 (Image 4) presents the face of a cartoon girl in half green and half brown with happy symbols such as hearts and smiling faces on one side of the background and evil symbols such as skeletons, bats, and angry faces on the other side. She illustrated the extremes of happiness and sadness experienced by a patient with bipolar disorder through this image, saying that "you can't really put pictures of someone with bipolar disorder" and see just from their appearance what the disorder is like; and "for someone who has bipolar disorder, you can't just look at them and say they have it. It is a process to diagnosis it." She used various visuals such as cartoons images, pictures, and Internet images to compose the story and communicate the experience of bipolar disorder.

Image 1 (from Slide 2, Case A)

Image 2 (from Slide 4, Case A)

Image 3 (from Slide 6, Case A)

Image 4 (Slide 3 from Case A)

Jenny's Story

Jenny's story was about depression. In her three-minute video, she talked about the definition, the facts, the mental and behavioral symptoms, the physical problems, the causes, and the treatment of the illness. Jenny mainly demonstrated her understanding of the topic using online images and word-based images such as word clouds. She chose everyday images of people and objects not only to show explicitly and vividly the various aspects of the disorder (facts, causes, treatments, etc.), but also to connect the subject matter to her own life experiences. For example, Slide 8 shows a man sitting at a desk with furrowed eyebrows and surrounded by hands with all kinds of office tools (i.e., phone, pen) coming from different directions. Jenny selected the image to illustrate being stressed because it resonated with her. She said, "I am searching for stuff on my phone to do my homework, so I am kind of overwhelmed. So that's kind of like me." Her choice of representation here was based on empathy with people who have this disorder. Jenny also used everyday images with symbolic implications. For example, she chose an image of a smoking skeleton (Image 9) to convey the

fact that depression may increase smoking, thus relating the disorder to a deadly addiction.

Jenny selected a number of word-integrated pictures, including word clouds and words in handwritten form that represented abstract concepts. Her digital story started with a word cloud of things associated with depression. The big key word depression sits in the middle in red and is surrounded by various relevant words such as *hopeless, depressed,* and *mental*, words that tell "how you would feel if you have depression" and serves as a good "topic picture." In Slide 6 (Image 6), Jenny included a word cloud labelled "self-harming" to illustrate possible behaviors of depressed people. It defined the concept of self-harming with words such as *injuring, feeling,* and *abuse,* and it was shaped like a human brain. Jenny chose pictures with handwritten words to make the concepts feel more intimate and thereby convey the feelings of people with depression. Slide 5 (Image 7) has "I hate myself" written in white, slender and curvy lines on a black background, which Jenny chose to evoke malfunctional mental activities. Common to all these problems, she said, are difficulties concentrating, making decisions, and remembering things. She mentioned in her voiceover: "You just don't like yourself and find the image of 'I hate myself' in quotation marks a good fit." Image 7 reflects Jenny's learning about the suffering of people with depression. She selected a photo (Image 8) of a human fist with the letters P-A-I-N on the fingers (one letter for each finger), trying, again, to evoke the experiences of sufferers. She incorporated these images and texts to share her strong emotions about the disorder, and when you watch her video you can feel both the concepts she is communicating and her concern.

Image 5 (from Jenny's Story)

Image 6 (from Jenny's Story)

Image 7 (from Jenny's Story)

Image 8 (from Jenny's Story)

Image 9 (from Jenny's Story)

Kate's Story

Kate's story was about schizophrenia. Her video was 3 minutes 45 seconds, in which she defined the illness briefly and introduced the causes, the symptoms, and how people with schizophrenia experience the world differently. Kate included fewer images, choosing mainly technical images (two out of three of her images) to support her discussion. The image on Slide 8 (Image 10) presents the outline of a human brain and compares the MRI of a normal brain with the brain of a patient with schizophrenia, which supports the idea that schizophrenia is caused by brain chemistry, something that she also articulates in her voiceover. On Slide 14 (Image 11), Kate included an image that compares what a normal person would see when looking at a cat to what is seen by a patient with schizophrenia. The image illustrates vividly how people with schizophrenia feel and think differently about the world around them.
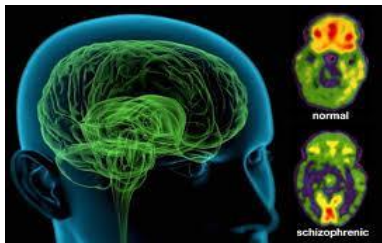

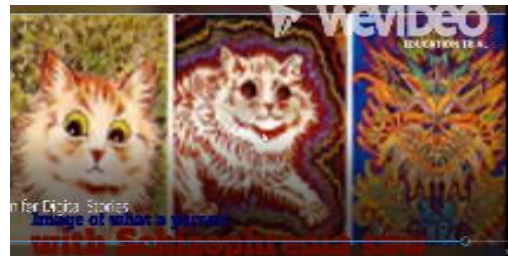Image 10 (Kate's Story)   Image 11 (Kate's Story)

From these brief descriptions of the stories' representational content, we can see how the students developed understandings of the mental illnesses. They also came to see these as disorders instead of personal failings. This began to address the pedagogical challenge of helping students from immigrant families engage with the difficult topic of mental illness. As we turn to the second, interpersonal dimension, we will see more clearly how this worked.

Choices about Interpersonal Meanings

The students' design choices also shaped the interpersonal implications of their digital stories. In addition, students designed their stories in ways that projected certain relationships with the audience. This was crucial for understanding how digital stories helped the students engage productively with mental illness.

Eye Contact and Social Distance

Molly and Jenny selected images that differed in the degree of eye contact and the establishment of social distance, in ways that shaped viewers' attention and evoked emotions. In Molly's story, the cartoon girl on Slide 3 (Image 4) is portrayed from her neck up, and her eyes gaze straight at the audience. This close-up with direct eye contact reduces interpersonal distance and demands increased attention from the audience, often arousing strong sympathetic emotions. The crying girl on Slide 8 (Image 12) faces the audience with her eyes in tears and her full body shown. The image creates medium social distance from the audience and vividly presents the tantrums a child with bipolar disorder could experience. It is strong, but a bit more analytic than the prior image.

In Jenny's story, Jenny included images that execute what Kress & van Leeuwen (2006) call demand and offer. In Slide 8 (Image 5), a man is portrayed from the waist up looking directly at the audience with eyebrows frowning. The close interpersonal distance here places the audience in the position of someone sitting across the table who can vividly experience the man's upset feelings, caused by excessive multitasking, and can generate strong sympathy for him. In Slide 6 (Image 13), a little boy is sitting against a wall with his body facing towards viewers, but his head is buried in his arms. The image communicates to viewers the boy's depressed condition and yet creates detachment for the viewers through the distanced long-shot and the lack of eye contact. By combining detachment with an "offer" to empathize, in a complex way (Kress & van Leeuwen, 2006), Jenny told the audience accurately how people with depression suffer, yet she also evoked how depressed people tend to separate themselves from others and refuse to communicate. Thus, her emotions and her stance toward other people was engaged in her story.

Image 12 (Slide 8 from Molly's story)

Image 13 (Slide 8 from Jenny's story)

Image 14 (Slide 6 from Kate's story)

Molly and Kate's stories used changing positions to interact with viewers. In Case A, Molly occasionally shifted from the position of a professional explaining bipolar disorder to a learner reflecting on her field trips. She folded her field-trip photos into her explanations of bipolar disorder three times; in this way, viewers were positioned not just as learners who are interested in knowing about the disorder, but also as witnesses to her own learning process. Kate's story presented questions written from the audience's perspective and answers from teachers' or experts' perspective. For example, Slide 9 (Image 14) poses the question "How will I know if I have Schizophrenia?" from the viewer's perspective. This question was quickly answered by Slides 10 (Image 15) and 11 (Image 16) where she listed a few symptoms of schizophrenia (hallucinations, false beliefs, etc.), speaking as a knowledgeable professional. Kate started her video by asking, "Ever wondered what Schizophrenia was?" positioning herself as a host speaker and drawing the audience in by using a question. Kate intentionally made her digital story expressive, "like a mystery that tries to drag you in."

This interpersonal stance revealed her intellectual engagement with the subject matter, and it also showed how she became comfortable addressing mental illness. By allowing her to

engage the difficult topic of mental health in a digital storytelling format, the teacher opened a space or her to address it productively.

Image 15 (Slide 10 from Kate's story)

Image 16 (Slide 11 from Kate's story)

Choices about Configuration and Composition

Some of what students communicated depended on certain configurations of signs. We explore three ways in which they created such configurations, focusing on image zones, color contrasting and salience, and the relationships between visuals and audio. This provides more detail on how the specific composition of digital stories can allow students to organize information and express their attitudes. This is a complex medium for communicating interpersonal, and emotional content (Kim & Li, 2020).

Image Zones

The layout of images is typically divided into two zones, center and margins (Kress & Van Leeuwen, 2006). The center is the nucleus of information, and the margins or the periphery are subordinate to/dependent on the center. All the students' digital stories use a center-margin organization of image zones. Molly's story frequently included a single image on each slide (six out of nine slides) and occasionally put single- or double-word texts (three slides out of nine) alone on the screen. The images were either placed in the middle of the screen (three out of six) or enlarged to cover the entire screen (three out of six). The written texts appear in large font in the middle of the screen.

Jenny's story applied a center-margin structure in four of her nine slides. She placed a single big image in the center and added a topic title (i.e., definition, thoughts people have during depression, etc.) in the top left corner. In addition to this, she used two other forms of visual organization: left–right, in which images on the left are typically more familiar and images on the right typically communicate new information; and top–bottom, in which images on the top are typically more general and those on the bottom are typically more specific. One pattern she used was having two images on the same slide, one on the left and the other slightly higher on the right. Another pattern was having three images on the same slide with the first one on the left, the second one on the top right and the third one on the bottom right (i.e., Image 13).

Kate also enlarged each of her images to cover the whole screen, placing them in the center. Three online images that she used themselves contained image zones divided into left, middle, and right parts (i.e., Image 16) and fit into the left–right category.

Image 13 (Slide 6 from Jenny's story)

Image 17 (Slide 6 from Kate's story)

Image 18 (Slide 9 from Jenny's story)

Color Contrasting and Salience

All the stories used contrasting colors to mark salience. Molly's used a simple white background that contrasted sharply with the color of the images and written texts, to drive the audience's attention to valuable information about bipolar disorder. The title, *Bipolar Disorder,* is in black and large font with a white background, occupying two thirds of the screen space, while the author's name is presented in black with smaller font size and a purple background covering one third of the screen. This design helps the audience distinguish the most salient topic (bipolar disorder) from minor ones.

In Jenny's story, she placed all the colorful images on white backgrounds and typed all her subtitles in black to make them easy to see. Most of the images she chose have a light background that helps the main characters and objects stand out on the screen (i.e., Slides 8 and 9). Exceptions occur in some of her images (i.e., Slides 3 and 6), where a black background is used to foreground important light-colored visual information such as a skeleton or cigarettes.

In Kate's story, she used text (11 out of 15 slides) with large font sizes and contrasting colors to hold the audience's attention. She used white, yellow, and red to highlight texts on a black background and assigned different colors and font sizes to different lines. For example, Slide 6 (Image 17) includes, "It is a disorder that's characterized by hallucinations." The last two words were put on the second line in yellow, bolded, and enlarged, while the rest of the sentence remained on the first line in white with a smaller font size. Such design draws the audience's attention to the key terms.

Visual/Audio Relationships

Projection and Expansion. Molly and Jenny closely related their visual choices and oral scripts (voiceover), frequently using projection, and occasionally through elaboration or extension. Kate's story has a weak audio–visual relationship with limited samples of projection and enhancement. Projection is a common audio–visual relationship in Molly's and Jenny's story. Molly's story (Image 4) used symbolic icons such as red hearts and smiling faces to project a manic episode, where "a person would go through extreme happiness and would be overly hyper," and icons such as black bats and white skeletons to project a depressive episode, where

"a person would experience extreme sadness, lack of energy or interest in things," as she explained in her voiceover. Jenny's story projected her oral script mostly through various images from daily life in her digital story.

Elaboration occurs when the student selects specific visual images to exemplify the ideas stated in the voiceover. Jenny used a photo of pills and syringes on Slide 9 (Image 18) to exemplify the medications for treating depression that she described in her voiceover. Extension occurs occasionally in Molly's explanation of subtopics of bipolar disorder when describing her field trips. For example, Slide 2 shows students sitting in groups trying art therapy, which aligns with her voiceover:

> The treatment for bipolar disorder can range. Depending on the person, medication can be an option, for example different types of mood stabilizers. There is [are] also different types of therapy a person with this disorder can attend (Part I). In this picture, the psychology capstone is trying art therapy to see how effective it was. It worked, we got to release our emotions in a safe and quiet environment on paper however we wanted (Part II).

The image here directly represents Part II, yet it also serves as an extension to Part I that is more relevant to the subtopic of bipolar disorder. Molly stated, "art therapy is an option for treatment." Similarly, on Slide 4, a student observes a young child in an art class, projecting the second part of the voiceover: "in this picture our capstone visited an art class for kindergarten just to observe them and assist them in there [their] projects." However, this leaves the main subtopic (the causes for bipolar disorder) visually unpresented. Molly extended the main subtopic to the scene of child observations based on her belief that "little things can affect kids and that's why art was a nice way to calm them down."

Kate selected technical images to solidify her explanation of specific knowledge in an enhancement about schizophrenia. For example, the different brain structure of people with schizophrenia illustrated on Slide 8 enhances the voiceover: "It's a combination of genetic and brain chemistry, and environment contributes to develop this disorder." By focusing students' attention on the implications of design choices like this, the teacher was able to help them learn about the subject matter, understand the nuances of how to communicate to an audience, and also give them an opportunity to express their own reactions toward the threatening subject matter.

Sociocultural Influence on the Design Choices

The digital stories also reflect the individual author's sociocultural contexts, through their topic and subtopic choices. Molly chose to learn psychology because she had seen patients of her mother, who worked as a nurse. Molly explained her decision to choose bipolar disorder: "It is one that you don't look in and see why it is there, how it can be treated." Molly also showed her special care for children by explaining disruptive mood dysregulation disorder (bipolar disorder in children), which links to her own identity as a child.

Jenny chose psychology as her capstone project because of her own interests in the topic: "it is common and I wanted to see what it feels like for people that have depression;" "a lot of my classmates seem really sad and down all the time;" and "some of my family have had depression, too." She also described her own struggle with the middle school experience and a communication gap between herself and her parents.

Kate chose psychology because she wanted to be "a doctor and a psychologist" (also her mother's wish), and she wanted to learn about the brain. She chose schizophrenia because it is a rare disorder and she wanted to "learn more about how people see things that nobody else sees." All three students had strong interests in human functioning and showed their empathy with people who struggle. The digital storytelling format allowed them to engage their own personal experiences and perspectives, as they took on challenging topics.

DISCUSSION

Immigrant students face many challenges that teachers must address. We have focused on one challenge, the difficulty engaging issues of mental illness. We argue that beginning teachers should adopt digital storytelling as a pedagogical tool, because students can use these stories to learn subject matter and also work through their own perspectives on challenging issues. Digital storytelling allowed the middle school students in our study to personalize their learning about mental disorders. Through the multimodal medium of digital stories, they were sometimes able to express their own voices in relation to the subject matter and they were also able to engage fellow students through their capstone presentations. By analyzing the digital stories themselves, we have been able to offer detailed descriptions of how the students did this. By understanding how digital stories work, beginning teachers can more effectively use them to facilitate learning and personal development for immigrant and other students.

Sense Making in the Composition of Digital Stories

Sense making involves elements of learning that include creativity, comprehension, curiosity, and situation awareness. It is "a motivated, continuous effort to understand connections (which can be among people, places and events) in order to anticipate their trajectories and act effectively" (Klein, Moon & Hoffman, 2006). Digital storytelling allowed middle school students to make sense by connecting the psychology subject matter to their own experiences through the composition process. Students engaged in sense making by incorporating symbolic visual elements, adding voiceover narration, exploiting audio-visual relationships, and conveying attitudes and positions through varying degrees of social distance. For example, Molly engaged in learning about mental disorders using various visuals and language, in her case emphasizing images of ways in which her field trips enriched her own life experiences. Jenny also used images of people and objects that resonated with her own life experience.

The students systematically connected the subject matter described in their digital stories to images, audio, and concepts from their everyday lives. For example, they used

symbolic visual elements, such as smiling faces and a smoking skeleton, to draw on familiar, common meanings. They also used common, everyday explanatory language for their voiceovers, with little disciplinary vocabulary, as in words like *substance abuse* and *tantrum.* Middle school students made sense by adding such visual elements and narrations to the digital story. They also included at least one image with direct gaze and close-up distance to invite the viewers into an imaginary, intimate personal relationship with sufferers and to ask viewers to share their pain.

It is true that students' analyses in the digital stories convey only a relatively rough, surface-level learning of the disorder. For example, substance use in the voiceover was illustrated with an image of pills, cigarettes, syringes, and wine without further visual or textual explanation. Kate did include two technical images in her 15-slide digital story; however, instead of analyzing the differences in detail, Kate concludes generally that the disorder can stem from genetics and brain chemistry and can cause people to see an image differently. Despite the lack of deep disciplinary understanding, the digital stories did allow students to engage in a preliminary way with the subject matter. We also have to remember that these were short three-week capstone experiences meant to whet students' appetites, not full courses or curriculum units.

Despite their limitations, the stories offered students opportunities to connect their own experiences and articulate their own voices on issues related to the subject matter. We have shown this, for example, in how students created relationships between the viewer and the viewed. They chose pictures with various focalizations, social distances, and attitudes for their digital stories. All three students went through their own distinctive thinking processes when applying multimodal signs as tools in their learning of mental disorders. In their learning processes, visual representations played a pivotal role in the individualized interpretation and representation. Molly's field-trip photos connected her to the topic personally, while her cartoon photos aimed at an implicit display of how a patient may look; Jenny's various images of real people reminded her of her own stressful moments and her various word-embedded images offered rich visual and linguistic clues to a psychological issue; Kate used fewer images but richer written language laid out in contrasting colors and sizes. Her proliferating questions and answers reflected her own path in exploring schizophrenia. The students mediated interactions with the audience by creating a wide range of social distances and types of contact, to evoke emotions and offer different perspectives (e.g., an expert, a learner, a host speaker). Their tools in this respect included various portraits of full-frontal faces with direct and indirect gaze, images of field-trip scenes, and oral and written language.

Nilsson (2010) describes how the multimodalities available in digital storytelling create semiotic means to "show the world creatively" instead of "telling it flatly." In order to achieve the benefits of this multimodal medium in the classroom, it is important for teachers to analyze students' choices of signs and modes as one way to observe students' thinking and offer personalized instruction. This study shows the importance of analyzing students' design choices

in their digital stories, from which teachers can observe how individual students think and how they connect personally to the subject matter. It is also important for both teachers and students to increase their understanding about the multiple affordances of multimodal media like digital storytelling for learning and demonstrating learning in depth, and perhaps also for assessing learning. With more detailed understanding like this, teachers can use this tool to engage students personally and help them overcome challenges like those faced by immigrant students wrestling with mental illness as a topic.

Design Choices and Self-Expression

All three students made unique design choices to reflect their learning and share their self-expression while developing new perspectives towards mental health. The topic the students selected was itself a form of self-expression. Molly chose bipolar disorder as her topic, in part because she was interested in how the disorder could characterize people who appear normal on the surface. "You can't just look at someone and say they have bipolar disorder. [It] takes a long time to diagnose." Jenny selected an image (Image 5 from Slide 8, Jenny's story) for illustrating being stressed, because it resonated with her own life experience of having too much homework or too many different things to do at one time:

> [it] is sort like me—my dad would be yelling at me "what time is it!" "You are supposed to eat right now!" But I am still working on my homework. Then my mom will be on the other side be like "Stop getting on your phone!" And I am like "I am searching stuff on my phone to do my homework," so I am kind of overwhelmed. So that's kind of like me.

Jenny also identified with and felt empathy for depressed people. She described how we easily ignore those who suffer from bipolar disorder:

> If you are a person that does not have a disorder, and you know someone who does have a disorder—you are probably going to be like it is easy being them and it is really simple. But they are really annoyed, and they wished they didn't have that. Sometimes they wish they were dead than being with the disorder. And they feel bad for themselves.

What these students learned about disorders during the project helped them realize the painful feelings people with mental disorders can experience and helped them see how they experienced some similar emotions in non-pathological form.

The middle school students gained insights into dealing with real people and real situations in their daily lives. After the project, Molly realized that she could not judge others simply by looking at them. Instead, she needed to know more about a person before making a judgment. Jenny displayed her confidence about helping people, as well as herself, deal with depression. She noticed that depressed people may fake being happy in interpersonal communication and she developed strong empathy for them. The project and the field trip to the women's center prompted Kate to reflect on body shaming and to come up with coping strategies when facing its challenges. Molly noted in the interview that "People say bad things about others and then they start crying. Why start crying when you could just say 'Thank you. I

take that as a compliment. I am glad that you noticed because I know you are jealous of me—bye.'" All three students were able to create more positive stances toward mental health issues like this, through the process of building their digital stories

The three students all said that they would like to create more digital storytelling projects in the future. For example, Molly wanted to create a digital story around religion or science with Google slides. Jenny wanted to compose digital stories with topics such as sports, food, culture, and other disorders. Kate mentioned two options for her next digital story project: Spanish and photography. Being a Spanish-English bilingual, Kate ranked her home language as her favorite subject and was strongly motivated to create a video about the Spanish language that would be easy and fun.

The study shows the three middle school students' strong interest in knowing about psychology and thus indicates that it might be a worthwhile subject for middle school students. Learning about this subject matter, even in a short capstone unit, facilitated positive changes in students' actions and perspectives. Cholewa and West-Olatunji (2008) describe how the great challenge of cultural and environmental adjustment can leave urban, ethnic-minority students vulnerable to mental stress. Students can "experience a developmental mismatch between their individual needs and available supports within their school contexts" (Carney, Kim, Hazler, & Guo, 2018, p. 2). Teaching about mental disorders and challenges can offer immigrant and other students tools to evaluate their own mental health, so that they can seek timely help if needed. It also improves students' understanding of those who suffer from mental illnesses and encourages empathy toward them, which can lead to stronger social-emotional skills in real-life settings. We advocate for more middle schools to offer psychology learning programs to improve students' understanding of common mental disorders, and we recommend a digital storytelling as a useful medium to teach this subject matter.

This multiple-case study has shown how digital stories paired with mental health curricula can benefit middle school students from immigrant families. Digital storytelling has great potential in the learning and teaching of psychology, especially in its ability to support personalized learning and improve mental health awareness among students from immigrant families. Moreover, attending carefully to the details of digital stories can help teachers learn about their students' subject matter learning, personal concerns, and capacity for communication across multiple media. Future study could productively include design research with a variety of digital-story-based mental-health projects in different schools. Further work could also attend to students' different sociocultural backgrounds and explore how they connect to mental-health learning and multimodal design choices.

Acknowledgements

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