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Wanting to Share: How Integration of Digital Media Literacy Supports Student Participatory Culture in 21st Century Sustainability Education

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Abstract: Recognizing that most modern students have access to smartphones equipped with multi-media capture capability, this article explores how sustainability education must include digital media literacy in 21st Century learning. Through the lens of a sustainability and media teacher, the article analyzes literature from the fields of digital media literacy, 21st century skills, and sustainability education. The author ties together theoretical and practical methods of how embracing digital media when teaching sustainability can enhance student learning and sharing of sustainability knowledge. With references to emerging trends, critiques, and challenges to media technology adoption in sustainability education settings, the author outlines several techniques to empower teachers and students to incorporate technology they already use daily, and share their work with greater audiences to engage communities beyond the classroom.

Keywords: Digital Media Literacy, Critical Pedagogy, Sustainability Education, 21st Century Skills Communication, Multi-Media, Participatory Culture

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Introduction

I work with teens every day on developing their voices through digital media at an afterschool youth media center called SPOT 127 in the Phoenix, Arizona metro area. I craft lessons, plan projects, and research innovative media approaches to engage our students. When we start projects, we begin with pitch sessions, throwing out ideas to develop content about. While I suggest issues of sustainability, it often prompts some talk, but they often get lost in talks of the popular social issues. However, when these students have been brought on field trips to the natural world with cameras and recorders in hand, they ask questions and begin crafting stories about immediate issues, such as water conservation in the desert, but also future sustainability problems. Rather than hearing opinions about school and sports, we start to hear more about the future, and where the students see themselves and each other in it.

Years prior, I was a high school teacher leading a sustainability program. I made it a mission of mine to be entirely paperless, which I nearly was utilizing the emerging Google suite, including Google Sites and Docs, enabling each student to have their own learning portfolio. Along with typical papers and reports, I had students do more with multi-media integration by

taking pictures, video, audio recordings, etc. of their field and lab work. We also explored third party platforms to embed elements like infographics and interactive timelines. I wanted to see how they approached assignments by using media to present their sustainability understanding. With a diversity of media options, the content they produced began shaping their own voice of how they interpreted sustainability.

Digital media literacy, where students critically think about media while intelligibly producing and consuming it, is now a regular part of the conversation of 21st century skills. While revising this article, the COVID-19 pandemic made the lack of digital media literacy in classrooms more apparent as teachers and students have struggled to incorporate media in the transition to remote learning. This has been mostly felt by minority and poorer populations due to a lack of digital accessibility (e.g. internet access), well known as the "digital divide." Yet sustainability education, before or during the pandemic, was not yet included in this conversation. In bridging digital media literacy and sustainability education, sustainability educators must be ready and willing to navigate the acceleration of media permeating the education landscape, as it is happening and will continue to happen with our insight or not.

This article gives strong reason as to why aligning sustainability education with digital media literacy can increase sustainability's presence in teens' media participatory culture, especially as more students engage in, share, and produce media to a similar extent of consuming it. It explores literature on how digital media literacy as a 21st century skill should be approached through a lens of sustainability education. I will then share examples of how and where media and sustainability education can successfully merge.

The Rise of Digital Media Literacy in 21st Century Skills

The notion of *21st Century Skills* has become nearly as ubiquitous in K-12 education as *STEM* (science, technology, engineering, and mathematics) has. Like competencies in sustainability, the diverse skills deemed necessary for the 21st century have been reduced to many lists and standards. Here are some commonly mentioned 21st century skills (Trilling & Fadel, 2009; Pacific Policy Research Center, 2010; Pellegrino & Hilton (eds), 2012; Partnership for 21st Century Skills, 2019):

- Problem Solving;
- Critical Thinking;
- Communication;
- Collaboration;
- Self-Management;
- Learning to Learn.

As Trilling and Fadel (2009) wrote in *21st Century Skills: Learning for Life in Our Times,*

> though many of the skills needed in centuries past, such as critical thinking and problem solving, are even more relevant today, how these skills are learned and practiced in everyday life in the 21st century is rapidly shifting. And there are some new skills to master, such as digital media literacy, that were not even imagined fifty years ago. (p. xxiv)

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While Trilling, Fadel, and others (Rotherham & Willingham, 2010) argued that most of what are called 21st century skills are nothing new, the development of digital media literacy is new with this century. In the *Framework for 21st Century Learning* (2019) developed by researchers, government agencies, and NGOs forming the Partnership of 21st Century Skills, "Information, Media and Technology Skills" represents a third of the framework they present. The Partnership noted that "people in the 21st century live in a technology- and media-suffused environment, marked by various characteristics, including:

- access to an abundance of information;
- rapid changes in technology tools;
- the ability to work individually and collaboratively.

The Partnership broke down information, media, and technology into different categories, suggesting how to actively and critically analyze media while creating and disseminating media. A separate organization, The New Media Consortium, comprising a large community of universities, museums, and research agencies, released "A Global Imperative: The Report of the 21st Century Literacy Summit" (2005), which defines 21st century media literacy as:

> the set of abilities and skills where aural, visual, and digital literacy overlap. These include the ability to understand the power of images and sounds, to recognize and use that power, to manipulate and transform digital media, to distribute them pervasively, and to easily adapt them to new forms. (New Media Consortium, 2005, p. 2)

While the calls for increased digital media literacy have been made since the start of the century, reports indicate that nationally, the United States is lagging in digital skills for problem solving. A letter penned by over 40 members of Congress in October 2014 to the National Academy of Sciences (NAS) cited a report from the Organization for Economic Cooperation and Development (OECD) indicating that students in the U.S. are deficient in using digital technology for the purposes of acquiring and processing information. The letter argued that this "digital divide" will degrade the competitiveness of the nation's workforce (Sinema et al., 2014). The members of Congress have called upon the NAS to convene a committee of experts to expedite the integration of digital literacy skills throughout K-12 education. In October of 2019, house bill H.R. 4668: Digital Citizenship and Media Literacy Act was introduced to congress, though it has not advanced in the committee of Education and Labor (congress.gov, 2020).

While the congressional letter focused on economic preparedness in reference to the OECD report, issues of social justice regarding the digital divide are also a concern. Educator and critical pedagogy theorist Henry Giroux argued fervently that new media must be considered for modern critical pedagogy. His work emphasized this concept, saying:

> the scope and power of new informational technologies, multimedia, and visual culture warrant educators to become more reflective about engaging the production, reception, and situated use of new technologies, popular texts, and diverse forms of visual culture, including how they structure social relations, values, particular notions of community, the future, and varied definitions of the self and others." (Giroux, 2004, p. 67)

And as David Buckingham notes in his discussion of media education for the 21st century, "it is centrally concerned with developing critical understanding" (Beckingham, 2018, p.16) and that "if we ignore [media education]…, we are consigning education itself to irrelevance" (p.15). He warns it is important not to teach media literacy as merely a set of

competencies, as the complexity of the media landscape can be oversimplified if reduced to lists of concepts and skills to merely check off (Buckingham, 2007). As interpersonal and mass communication expands and evolves in digital forms, designing methods of sustainability instruction and curriculum with digital media technology makes sense, a conclusion reinforced by economic and social justice calls for digital media literacy in the 21st century.

Intrinsic Sustainability Education Through Multimodal Sustainability Communication

While authors, governments, and NGOs argue that becoming literate in digital media is a necessary 21st century skill for social and economic development, Stephen Sterling (2001) wrote that an essential change for sustainability education lies in the difference between an intrinsic education and an instrumental, or extrinsic, education. An intrinsic education stresses that education is "an end and good in itself," whereas an instrumental education understands the learning process as "a means to an end," be it a grade, degree, or career (Sterling, 2001, p. 25). When applying this concept to sustainability, we must recognize that sustainability itself does not have an absolute end. As sustainability issues continuously evolve, so must the learner, which means the learning process itself should be ever changing. To know how to learn, problem-solve, adapt, and critically think are intrinsic end goals with effective sustainability education.

So then, how do we foster a student's intrinsic desire to learn sustainability? For most students, it may be meeting them where they already are. A 2018 report from the Pew Research Center states that "fully 95% of U.S. teens have access to a smartphone, and 45% say they are online 'almost constantly,'" and spread their time across multiple social media platforms (Anderson & Jiang, 2018). However, most media instruction at the K-12 level is voluntary, either in elective courses at school or in external programs, such as SPOT 127 where we do not offer any credit or grades. This means students are giving countless hours of their lives to media because they simply want to participate in the digital environment and share what they are learning. Therefore, aligning sustainability education with digital media literacy can increase sustainability's presence in teen's media participatory culture where they can frame sustainability through their own values.

To foster an intrinsic desire to learn sustainability concepts, communicating and sharing what is learned is vital for the outcomes sought by sustainability education. For teaching a future sustainability change agent to best engage their communities, sustainability communication may be the most critical component of sustainability education. The rapid evolution and diversification of modern communication, with changes ranging from different media to audiences of scale, have made the messaging of sustainability more complex while being directed at diversifying communities. As Anthony Cortese, Senior Fellow of Second Nature and cofounder of the Association for the Advancement of Sustainability in Higher Education once said, "communication in sustainability is like location to real estate" (Cortese, 2014).

Andreas Ziemann in *Communication Theory and Sustainability Discourse* wrote that "sustainability communication is a global social process (and one that is accompanied by the mass media) that consists of the recursive order of contributions and arguments to the theme of a better ecological, economic and social life" (Ziemann, 2011, p. 92). He states that sustainability communication has the following goals:

- *Popularization*: Concepts and plans of sustainable development should be known to the public and offer concrete orientation for action.
- *Innovation and Alliance*: Decisive innovations should be initiated through a variety of social actors working together by building strategic networks.
- *Information and Education*: Sustainability contents and aspects should be firmly embedded in education to develop reflexive competence early in life.
- *Research*: Sustainability needs to become a central topic in interdisciplinary scientific discourse with accessible perspectives and applications for decision makers. (p. 92)

Ziemann argued that sustainability communication and discourse needs to frame sustainability as an "intrinsic social value," where a student learns for the sake of learning and desire to help, though to do so will be a struggle as it enters value structures dependent upon short-term goals, previously embedded social structures, cultural habits, and individual intentions (p. 94). Students will need to navigate multiple mediums and messages to convey any given message to different audiences. The New Media Consortium observed "new forms of communication appear to include layers of meaning which are not accessible by traditional language skills alone" (New Media Consortium, 2005, p. 3), meaning modern communication has gone beyond just one or two avenues. The ability to have several points of interaction with something (e.g. a system or device) is known as *multimodal interaction*. Systems designed to have multiple interfaces can be manipulated in many ways, increasing users' ability to obtain desired results. This results in a greater number of options for data input and data output (Stivers & Sidnell 2005).

Multimodal interaction of media can drive intrinsic learning, otherwise *multimodal learning*. If teachers differentiate their instruction, providing students the option to exercise their learning in different media, such as physical projects, podcasts, pictures, reports, stories, models, etc., and integrate them into multimedia pieces, it will help to diversify learning landscape and accommodate student creative preferences. This stands in opposition to current linear learning structures which allow for a single learning outcome at a time, often measured by the same assignment (Bernier, 2015). But to keep sustainability learning exclusively in the classroom no longer aligns with social youth experiences; so if we design curriculum through a multimodal orientation and guide a student's desire to share their accomplishments and learning with friends, family, and a potentially larger audience via multimedia social platforms, learning should clearly be evident (Tomlinson, 2010, p. 21). That is, if they are thinking with engaging local and global communities (i.e. intrinsic social value), and not just getting a good grade (extrinsic learning).

Supporting Students for Accessible Digital Media Participation

To engrain sustainability as an intrinsic social value, students must be able to participate in sustainable development, and sharing digital media may be the most readily established and easiest means of doing so. With a recent survey from Common Sense Media (2019), their results concluded that over half of U.S. children over the age of eleven and 84% of teens own a smartphone. That means most tweens and teens have mini-production studios linked to potentially thousands (if not millions) of audience members, right in their pockets.

Jenkins et al. wrote that the diverse digital media landscape creates and fosters a participatory culture, which is "a culture with relatively low barriers to artistic expression and

civic engagement, strong support for creating and sharing one's creation, and some type of informal mentorship whereby what is known by the most experienced is passed along to the novices" (Jenkins et al., 2009, p. 3). Maybe more important to foster an intrinsic sense of sustainability learning is that "a participatory culture is also one in which members believe their contributions matter, and feel some degree of social connection to another (at least they care what other people think about what they have created)" (p. 3). However, John Blewitt (2006) cautioned for as much positive media production regarding sustainability is released, students and teachers need to be ready for an equal, negative amount free to arise in response (e.g. "green washing," climate change denial, hate messaging). Still, "there are tensions and contradictions in the fact that the media can almost equally be seen as an opportunity or a threat, but there's a great deal at stake and everything to play for. The media is there, new and old—use it" (p. 188).

Jenkins et al. noted further challenges facing student engagement in digital participatory culture, namely accessibility, transparency, ethics, and schools slow to react to participatory culture. However, they noted several studies found that when participatory culture of digital media is constructively used in education, it develops not just the media literacy skills described by 21st century skill proponents, but nearly all of the skills outlined in common 21st century skill lists including play, performance, simulation, appropriation, collective intelligence, judgment, transmedia navigation, networking, negotiation, and others (p. 4).

Of course, digital media literacy is not just for students. Research of science teachers using mass media to teach socio-scientific and sustainability issues to their students found that lessons were often compromised, not because of lack of content knowledge, but poor teacher understanding of how to create mass media pieces (Klosterman, Sadler, & Brown, 2012). As Jenkins et al. (2009) noted, since schools are slow to adopt digital media literacy, it may be attributable to older generations who serve as faculty and administration and are hesitant not only to embrace digital media literacy, but actively avoid integrating it into curriculum. This can be concerning because outside of parents, teachers may be a student's only guide to media literacy as students are prone to sharing personal data and artifacts because of their coming of age in a "networked public culture," particularly on social media (Horst, 2010). Even with academic plaudits, digital media literacy will require the same systemic integration across education as elements of sustainability education does (Lopez, 2012; Jenkins, 2009; Sterling, 2001).

There are organizations actively working to systematically move digital media literacy into education, and curriculums including it are being adopted as well. Such organizations include the New Media Literacies Project and The Media Consortium, along with Media Smarts, Center for Media Literacy, and the National Association for Media Literacy Education (Lopez, 2013, p. 165). One program, Project Look Sharp, has produced a comprehensive curriculum designed by secondary and undergraduate instructors merging sustainability literacy and media constructs. It is intended for secondary and undergraduate students with emphasis on not just the understanding of some of the more scientific concepts of sustainability, but how to best communicate them (Project Look Sharp, 2014).

But time is not on the side of traditional education as the media landscape is constantly shifting. While the above organizations are often able to work with schools as curricular support in elective or career training programs (Lopez, 2013), media participatory culture is growing faster among students outside of the classroom. This is where auxiliary and afterschool programs

dedicated to media can support the reach of digital media literacy. Many youth media centers like SPOT 127, either independent or affiliated with public media outlets, offer a diverse range of programming to support creative freedom for students, many for free. For sustainability, we have had students do videos and podcasts regarding water conservation, outdoor recreation, and local social justice (Bernier & Fowler, 2020). Part of our teaching is for our students to best identify who their stories are for, so their creativity often comes through framing sustainability through a specific lens to engage a targeted audience to act (Orr, 2006; Nisbet, 2010; Ott, Muraca, & Baatz, 2011) or pairing unsustainable actions with solutions.

A great example of students engaging each other beyond the classroom comes from Democracy & Me, a youth media education outreach project from Cincinnati Public Radio. A recent student produced podcast called "Our Future On Fire" features students from Cincinnati, Ohio and the Navajo Nation in Arizona, sharing insights and hopeful solutions about climate change with Generation Z concerns and the wisdom of Native American culture (Stevenson et. al, 25 September 2020). While some students are interested in journalism and storytelling, others want to discuss sustainability issues, and if traditional school settings cannot meet this need, a need that can be easily incorporated into daily class instruction, students will find external, non-formal educational organizations to satisfy their interest, further relegating in-school time to

irrelevance. While nice to have these programs, it is precious time that could be spent on other non-class extracurriculars like sports or theater, or even spent outside in nature with family and friends.

Options for Media Integration: ePortfolios and Blogs

There are volumes of media platforms readily available to students and educators for immediate integration into daily classroom instruction, including blogs, wikipages, podcasting, RSS feeds, social media, and digital portfolios (Richardson, 2006). There are several case studies of successful use of using digital portfolios in classroom instruction to aid with digital media literacy development (Arvidson, 2012; Cramer, 2009). In "E-Portfolios in a Liberal Studies Program," published in *Teaching Sustainability, Teaching Sustainably* (2012), Arvidson discussed his being the first instructor to use e-portfolios at Seattle University. With his use of the Google's Sites platform, Arvidson noted the relative ease of using Google, due to its being free, stable in technology, and accessible. However, he also described concerns with ownership, viewing, and editing of the portfolios and how these limitations may compromise not only the student's work, but course content and security as well (Arvidson, 2012, pp. 164-165).

Having used ePortfolios, I too share the same concerns as Arvidson. I had students who were minors use Google sites and publish their own likeness via photograph or video (after getting parental releases). But the students started pushing the creative bounds of the platform and experimented with embedding files from external programs, such as systems mapping and info-graphic designs to present their work (Bernier, 2015). Arvidson described this intellectual development that e-portfolios can provide, saying:

> the primary goal of the e-portfolio is developing the capacity for intellectual growth, and the means for achieving this goal is metacognition. By getting students to think about thinking, they are encouraged not just to be a student but to understand and express what it is to be a student." (Arvidson, 2012, p. 166)

When students have to consider the design and intent of the medium their work is presented on, and not just content mastery, they have a better grasp of the learning process and how they can manipulate it, as opposed to merely turning in an assignment and having it out of their hands.

As part of maintaining a portfolio for work submission and documentation, I asked students to maintain a blog page. It is something I emphasized with my students for the entirety of the program (and became one of my favorite things to read and assess). Students were required to blog once a week but given freedom to write about anything in relation to their experience in class. The content ranged from personal events that happened within class or as a result of their experience with the curriculum, to something they heard or read outside of the classroom that got them thinking about course content (or vice versa). I also encouraged constructive criticism, such as how they thought the curriculum was lacking or missing something they thought important, or even something they saw not necessary. Completely open

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to emotion and content, I encouraged them to have no barriers or hesitation to express their independent thoughts, as this was their opportunity to have voice on how the class worked.

Students were requested to be multimedia savvy with the blog posts, though they were only graded on making a thoughtful post, not on media inclusion. Instead of simply writing text, or audio/video recording it, they were asked to also include hyperlinks to appropriate websites, embed online videos to complement their topics and insert pictures to give context to written reflections. I used the inclusion of multimedia from outside sources to encourage students to be more reflective on external topics, as I initially found students almost always wrote about personal matters. While personal writing was not discouraged, adding external media was an initial attempt to expand their perspective.

Student blog posts came in all forms, each sharing some insight or story to the student's experiences. A couple of students attempted "vlogs", or video recorded blogs, and one student did his blog entirely by podcast. While most students took advantage of multimodal media, some stuck to straight text. As part of prior research (Bernier, 2015), I found that when the language in a blog post was more positive in nature and external in perspective, there was greater use of class academic vocabulary. Though the variety of media utilized was not measured for its impact on academic outcomes, when focused on solutions and enjoying what they were learning, students were more apt to voluntarily engage vocabulary even though they were not graded on it.

Acknowledging a Seeming Contradiction of Media in Sustainability Education

C.A. Bowers, in *Let Them Eat Data* (2000) wrote that affording new technology is a burden to lower income populations and tends to exclude them from participation, still clearly evident by the COVID-19 pandemic and remote learning exacerbating the digital divide. But what may be the largest consequence of the shift to a digital environment is the exchange of wisdom for data. Bowers wrote that "centuries-old, sustainable traditions of craft knowledge are eroded, and self-sufficient societies become dependent on technologies that will, with further automation, introduce the same cycle experienced in the West—increased productivity with fewer and fewer workers" (p. 7). While data may help with productivity, efficiency, decision making, and high forms of knowledge, the wisdom developed from interpersonal relationships (particularly with elders), interactions with the land, and participation in community narratives simply deteriorates the more students are in front of a computer (or phone) screen (p. 12).

In this work, I often think how embracing digital media and technology for communication and fostering a participatory culture could be regarded as a contradiction to many sustainability education advocates making the call for bringing students back into nature. When teaching, there were moments where I felt my students spent too much time on laptops and not enough time working with their hands crafting a project or being outside and working with the campus landscape. Both the sustainability program I taught and SPOT 127 follow career and technical education standards, so hands-on learning is an expectation. A critical balance the sustainability program attempted to achieve was the use of digital media while learning about natural systems. Ultimately, I realized working with and in natural systems is how students will learn to work with nature. My classroom's location was at the intersection of two busy streets in metro Phoenix, making engagement with nature difficult. However, small gardens on campus

and use of school grounds allowed students to work outside when the Phoenix heat was not too oppressive. When students were outside, I insistently encouraged them to capture their work with video and pictures taken with their phones. The hope was that they would take this media and use it on their digital portfolios to showcase their work.

Surprisingly enough, students were not initially inclined to capture media about their work, as I was often the one snapping pictures and recording video, later providing media to the students for their portfolios. However, by their junior year, when the portfolios were better populated and media shared, I began receiving inquiries regarding the students' work from outside agencies, other teachers, and sustainability practitioners. The blogs and videos posted to YouTube particularly garnered the greatest attention. And most students started to bolster their portfolio as they were applying to internships and college admissions. So not only did their portfolios contain assignments and text, but they captured and presented the students working outside and allowed the students to use images and videos to describe their outdoor assignments and used the media to share what it was they were working on. This experience taught me that tempered and intentional use of digital media to complement outdoor learning can enhance a student's ability to share their experiences learning from both digital and natural landscapes.

Conclusion

To be clear, this article is not advocating for teachers or students to be subjected to more computer screens. Rather, it proposes a shift in how we use technology to positively contribute a student's sustainability learning in a growing digital participatory culture. There is no shortage of technology use in the United States, but the constructive use of digital media technology for the purpose of developing media literacy through sustainability education is lacking. And, as Williams and Brown have written extensively, technology and industrial curriculum can perpetuate keeping students inside artificial environments (Williams & Brown, 2012). However, with tempered use of technology in nature—or in the case of Williams and Brown, a learning garden—digital media can help spark the curiosity and wonder needed to see the interconnectedness of living systems that support sustainability education.

Richard Louv (2012), in *The Nature Principle*, wrote that reconnecting with nature restores of our personal and societal well-being, but that such reconnecting now must be done in a digitally connected time: that we must become "techno-naturalists." Louv argued that so long as we know when to put down our devices and take in nature with our own senses, the use of technology in nature can serve as a great invitation for people to come outside and "connect" (Louv, 2012, pp. 192-196). Since we are dependent on technology and tools such as backpacks and even the compass when we are outside, digital technology really is not too different. Louv wrote that using technology can further spark curiosity of the natural world, and that it will help shape what younger citizen naturalists will become in comparison to their older counterparts (p. 192). If we can use digital technology in nature, we are enabled to make new observations, and share with what we found in our little patch of the Earth with the rest of the connected world.

If we do hope to increase student media literacy through sustainability education, it should be done early and often enough so when they grab technology, they see it as a tool to learn and engage the natural world while creating and sharing with friends and beyond. If

sustainability is going to be a regular part of the conversation of 21st century skills, it must align with digital media literacy to increase sustainability's presence in participatory culture. It is the learning and then sharing of created sustainability media that can serve as the driving force of media literacy, helping our students become the connected sustainability change agents we seek to grow.

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