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Examining Demographics and Perceived 'Sense of Community' of Social Media-Based Professional Learning Communities

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ABSTRACT
Social media has undoubtedly shifted the landscape of educator professional development in the 21st century. The establishment and development of identifiable professional learning communities (PLCs) like the #SSChat social studies community on Twitter enables educators to connect and collaborate with other professionals across the globe from their own mobile device. The purpose of this study was to determine the demographic features of the #SSChat members. Moreover, we sought to determine if there were any significant differences in #SSChat member's perceived 'Sense of Community' (SOC) based on those demographics. No statistically significant findings were discovered. Still, the demographic data provide good discussions.

KEYWORDS
Social media; professional learning communities; sense of community

INTRODUCTION

Social media has undoubtedly shifted the landscape of educator professional development in the 21st century. The establishment and development of identifiable professional learning communities (PLCs) like the #SSChat social studies community on Twitter enables educators to connect and collaborate with other professionals across the globe from their own mobile device. Certainly, the #SSChat Twitter PLC assuages teacher isolation by connecting geographically dispersed professionals with common learning interests and needs (Hensley, 2021; Waters & Hensley, 2020). From asking questions and sharing resources, to contributing to dialogues and following discussion threads on specific social studies related topics, there are a bevy of opportunities to actively and passively engage within the virtual community using the hashtag – #SSChat. Given the marginalization of social studies-specific professional development opportunities (Thacker 2017), examining manifestations of informal and self-directed professional learning – like the #SSChat community is salient to the field. Research supports that social media-based PLCs like the #SSChat on Twitter are effective and viable mediums for supporting the professional learning needs of its members (Staudt Willet, 2019; Sturm & Quaynor, 2020). However, in a quantitative study that assessed the 'sense of community' and sustainability of the #SSChat community on Twitter, Hensley (2021) calls for a closer examination of the virtual community's membership.

As education scholars continue investigating social media-based PLCs' capacity to augment professional learning, certainly there is a need to better understand *who* community members are and how their demographics affects their perceptions of the virtual community. In this study we seek to better understand the #SSChat community's membership by examining the demographics and professional identities of its members. Additionally, we explored the potential affect that demographics and professional identities have on members' perceived 'sense of community'. Examining demographics and professional identities in relation to 'sense of community' will hopefully provide further context of the #SSChat community members, while also potentially yielding findings that may inform advances to strengthen diversity, equity, and inclusion within the #SSChat community.

Purpose of the Study and Research Questions

The purpose of this study was three-fold. First, we sought to better understand *who* the #SSChat Twitter community members are by examining their demographics and professional identities. Second, we aimed to assess the #SSChat community members' perceived 'sense of community' according to their demographics and professional identities. Finally, we aimed to investigate the potential relationship between #SSChat community members' demographic characteristics and professional identities and their perceived 'sense of community.' The research questions for this study were:

- What demographics/professional characteristics describe members of the #SSChat professional learning community on Twitter?

- What is the measure of perceived 'sense of community' among #SSChat members on Twitter according to demographics/professional identity?
- In what ways do member demographics/professional characteristics impact their perceived 'sense of community' of the #SSChat professional learning community on Twitter?

LITERATURE REVIEW

A Brief History of the #SSChat Twitter Community

Education researchers exploring social media have investigated the potential value of Twitter as a virtual social network that enables and fosters informal professional learning for P-12 educators, specifically those teaching social studies (Catlett, 2018; Howard, 2019; Langhorst, 2015; Lantz-Andersson et al., 2018; Trust et al., 2016; Visser et al., 2014; Yoakam, 2019). On July 6, 2010, social studies teachers, and pioneer users of teacher Twitter's #EdChat network, Ron Peck (@Ron_Peck) and Greg Kulowiec (@gregkulowiec) established the #SSChat out of a dialogue surrounding the need for social studies-specific discussions to support social studies teachers on Twitter (Krutka, 2017). The following week on July 12, 2010 the #SSChat hashtag was born and embedded in tweets for a chat related to technology integration in social studies (Krutka, 2017).

What began as a synchronous weekly virtual conversation thread by social studies Twitter users in 2010 has since evolved into a broader asynchronous forum. While #SSChat still hosts its weekly scheduled synchronous chats, the increased follower base and engagement has extended the conversation(s) of social studies education to be ongoing nearly 24/7 by simply embedding the #SSChat hashtag in a tweet and posting it on Twitter. Aside from engaging in the weekly chat that is usually themed and specific to certain areas within social studies, participants may pose questions, share classroom activities or student work, field trips, pictures from visits to significant places, news, and research articles among other items. Moreover, they can share these anytime and from nearly anywhere (Krutka, 2017). The #SSChat is a network operates simultaneously as a virtual PLC for social studies educators and other professionals on Twitter (Krutka, 2017)

Social Media-Based PLCs

At its core, social media-based PLCs were established to host virtual collaboration that offers teachers opportunities for self-directed and informal professional learning tied specifically to a content area (Howard, 2019; Langhorst, 2015; Trust et al., 2016; Carpenter & Krutka, 2014; Visser et al., 2014). Social media-based learning communities emulate similar features as face-to-face PLCs, albeit with the added convenience of being able to participate and access anytime and from virtually anywhere (Carpenter & Krutka, 2014; Staudt Willet, 2019; Waters & Hensley, 2020). In fact, when Staudt Willet (2019) revisited Carpenter & Krutka's (2014) study on 'how' and 'why' teachers use Twitter, they found that 64.66% of #EdChat community participants mainly shared scholarly work and resources and information including: blogs, videos, job

postings, and grant opportunities. These are all similar resources, materials, and information that would be shared in face-to-face PLCs.

A corpus of scholarship suggests that the observable behaviors and activities that manifest in Twitter-based PLCs reflect the qualities necessary to support educator professional learning outlined by both Darling-Hammond et al., (2017) and Lave and Wenger (1991). Namely, sustained duration through mutual relationships (Britt & Paulus, 2016) and content collaboration (Carpenter & Krutka, 2014). Sturm and Quaynor (2020) found that virtual communities on Twitter met many of Darling-Hammond's et al. (2017) and Lave and Wenger's (1991) attributes of an effective and meaningful professional learning community. Furthermore, Hensley's (2021) study, which assessed the sustainability and 'sense of community' of the #SSChat community, yielded findings that concur with Britt and Paulus (2016) and Carpenter and Krutka (2014). That is, Hensley (2021) found that on average, #SSChat community members regularly engaged in behaviors related to sustainability and collaboration (i.e., information contribution and consumption) between two to three times per month. Hensley (2021) also reported that a 'sense of community,' which is measured by community members' perceived feeling and recognition of membership, influence, fulfilment of needs, and shared emotional connection, exists among the #SSchat community members ($M = 1.71$, $SD = 0.424$). Clearly there are positive implications for professional learning and development associated with social media-based PLCs like the #SSChat. However, there is a dearth of research examining the impact of social media-based PLCs in relation to other salient factors – like community member demographics.

Analyzing Demographics of Social Media-Based PLCs

Demographic variables including, but not limited to, race, gender, ethnicity, education, profession, and years of experience are all data points that provide valuable context when studying any community. In a systematic review of teacher professional learning communities, Vangrieken, Meredith, Packer, and Kyndt (2017) highlight several empirical studies that suggest that demographic factors may influence individuals' perceptions of professional learning communities (see Gerhard, 2010; Graham, 2007; Jones, Gardner, Robertson, & Robert, 2013; and Parker, Patton, & Tannehill, 2012).

Analyzing the demographics of social media-based PLCs not only discerns *who* community members are, but also informs efforts to better grasp "how participants understand their experiences and place within the Twitter community and beyond" (Greenhow & Gleason, 2012, p. 473). Investigating the influence of salient demographic factors in relation to perceived 'sense of community' has potential to offer valuable insights into the potential differential impact that social media-based PLCs have on community members.

Theoretical Framework

We employed McMillan and Chavis' (1986) 'Sense of Community' Theory (SOC) to inform our study. The SOC theoretical framework is comprised of the four broad tenets that are considered

to be reflective of a strong 'sense of community.' (McMillan & Chavis, 1986). The four tenets include the following:

- Membership (i.e., sense of belonging)
- Influence (i.e., sense of mattering)
- Reinforcement and Fulfilment of Needs (i.e., sense that needs are being met within the community)
- Shared emotional connection (i.e., shared histories and similar experiences)

Recognizing the four core elements of SOC, McMillan and Chavis (1986) defined SOC theory as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together" (McMillan & Chavis, 1986, p. 9). The SOC theoretical framework enabled us to identify and gauge #SSChat community members' 'sense of community' as a construct rather than strictly a notion.

METHODS

Teasing parts of the complexities of social media-based PLCs like the #SSChat Twitter calls for employing diverse research methods (Staudt Willet, 2019). Given the purpose of this study and nature of the research questions, we employed a quantitative research design. We collected data using the Sense of Community Index (SCI) – II survey instrument (Chavis, Lee, and Acosta, 2008). The SCI-II survey instrument is a reliable and validated survey instrument that includes twenty-four items designed to assess participants' perceptions and recognition of the four tenets (i.e., membership, influence, fulfillment of needs and shared emotional connection) of the SOC theoretical framework (Chavis, Lee, and Acosta, 2008). Additionally, we assessed scale reliability of the SCI-II survey instrument with the #SSChat community using Cronbach's Alpha (α=. 910).

Participants

Participants in this study were identified using TAGS (Twitter Archiving Google Sheet) as a behavior trace measure (Hawksey, 2014; Hensley, 2021; Staudt Willet, 2019). TAGS allowed us to observe activity and behaviors within the #SSChat Twitter community by monitoring the #SSChat hashtag. We monitored the #SSChat hashtag using TAGS for a year, identifying potential participants who engaged both synchronously and asynchronously within the #SSChat community. We traced nearly 5000 unique tweets and identified a total of 1,583 potential participants. Potential participants were contacted via Twitter and invited to complete the survey. The survey was live for six weeks and weekly reminders were sent each week via Twitter. We collected 175 responses to the survey and after data cleaning there were 166 usable responses (10.5% response rate) to analyze. In addition to the SCI-II survey items, participants also completed 16 items that measured their sustainability and answered several demographic questions. For the purposes of this study, we only analyzed the participants' responses to the SCI-II survey items and the demographic questions.

Data Analysis

Before running any analyses, we first cleaned the data. Data cleaning involved removing non-response and erroneous survey data from our sample. Additionally, we removed surveys from respondents who did not identify as a member of the #SSChat community on Twitter. Both descriptive and inferential statistics were used in this study to analyze the data. Descriptive statistics and frequency tables were generated to understand #SSChat community members' demographic characteristics including age, gender, ethnicity, professional identities, geography (if applicable), and education; thus, we were able to answer research question one. To answer research question two, we generated means and standard deviations to analyze #SSChat members' perceived 'sense of community' according to their demographics/professional characteristics. Means were used to interpret findings on the original four-point scale (Not at All = 0, Somewhat = 1, Mostly = 2, Completely = 3) used in the SCI-II survey instrument. From there, we ran ANOVA tests to determine if #SSChat members' demographics/professional characteristics significantly affected their perceived 'sense of community'.

FINDINGS

Demographics of #SSChat Community Members

The mean age of respondents was 39 years, with an age range of 22–77 years. The greatest percentage of the sample (39%) was between the ages of 30 and 39. Table 1 summarizes the age range of the participants. Of the 166 participants, 61 were male (36.7%) and 70 were female (42.2%). Table 2 summarizes gender characteristics. The plurality of study participants was white (*n* = 61, 64.5%), followed by Black/African American (*n* = 21, 12.7%), then Hispanic (*n* = 4, 2.4%), and Asian (*n* = 2, 1.2%). Table 3 summarizes ethnicity characteristics.

Table 1. *Participant Ages*

Age	*N* =	Sample Percentage
22-29	33	17.4%
30-39	65	39%
40-49	37	25%
50-59	26	15.6%
60 +	5	3%

Table 2. *Gender*

Gender	*N*=	Sample Percentage
Male	61	36.7%
Female	70	42.2%
Other	2	1.2%
Prefer not to answer	33	19.9%

Table 3. *Race/Ethnicity*

Ethnicity	*N*=	Sample Percentage
Black	21	12.7%
Asian	2	1.2%
Hispanic	4	2.4%
White	107	64.5%
Other	8	4.8%
Prefer not to answer	24	14.5%

Most participants (*n* = 116, 69.0%) were teachers, followed by teacher educators and higher education faculty (*n* = 24, 14.5%). Table 4 summarizes the professional identities of respondents. These data were particularly important because they allowed us to glean the #SSChat community's core member base. In regard to geography, study participants reported working in the following school settings: urban school districts (*n* = 55, 33.1%), urban (*n* = 49, 29.5%), and rural (*n* = 43, 25.9%). Table 5 summarizes the geographical characteristics of the participants' school setting.

Table 4. *Professional Identity*

Occupation	*N*=	Sample Percentage
Administrator	1	.6%
Education Consultant	2	1.2%
Education Non-Profit Representative	3	1.8%
Educational Technology Specialist/Coach	3	1.8%
Former Teacher	1	.6%
Museum Educator	1	.6%
N/A	6	3.6%
Social Studies Curriculum Specialist/Coach	4	2.4%
Teacher	116	69.9%
Teacher Educator/Higher Education Faculty	24	14.5%
Teacher Leader	5	3.0%

Table 5. *Geographic Characteristics*

Geography	*N*=	Sample Percentage
Rural	43	25.9%
Urban	49	29.5%
Suburban	55	33.1%
Other	19	11.4%

Lastly, in regard to highest level of education, a total of 104 participants (62.7%) reported having a master's degree. This was followed by 19 participants (12.7%) reported having a doctorate and 17 participants (10.2%) reported having a bachelor's degree. Table 6 summarizes the various educational levels of the #SSChat community.

Table 6. *Education Level*

Education	*N*=	Sample Percentage
Bachelor's	17	10.2%
Master's	104	62.7%
Education Specialist	12	7.2%
Doctorate	19	12.7%
Prefer not to answer	12	7.2%

After summarizing the demographic data using descriptive statistics, we were able to glean a better understanding of who makes up the #SSChat professional learning community on Twitter. The information was salient as it provided a necessary contextual lens for how we interpreted the findings for research questions two and three.

Perceived 'Sense of Community' According to #SSChat Community Demographics

We used the following question from the SCI-II survey instrument to interpret #SSChat community members' perceived 'sense of community': *"How important is it to you to feel a sense of community with other community members?"* Chavis et. al (2008) posit that this question correlates with overall feeling and recognition of 'sense of community.' Hence, we generated means to interpret findings on the original four-point scale (Not at All = 0, Somewhat = 1, Mostly = 2, Completely = 3) of the SCI-II survey instrument.

Table 7 presents means and standard deviations summarizing #SSChat community members' perceived feeling and recognition of 'sense of community' according to their ethnicity. Findings indicated that on average, #SSChat community members from each ethnic group fell between *somewhat* and *mostly* when asked how important it is for them to feel a sense of community with other community members. Hispanic community members and community members identifying with 'Other' both yielded the highest means (M = 1.76). Asian community members yielded the lowest mean (M = 1.49). We then ran an ANOVA test to determine significance in perceived 'sense of community' in relation to ethnicity. The results indicated no statistically significant effect, [$F(5,160) = .444$, $p = .817$].

Table 7. *Perceived 'Sense of Community' According to Ethnicity*

Ethnicity	Mean	SD
African American/Black	1.75	.410
Asian	1.49	.469
Hispanic	1.76	.293
White	1.71	.448
Other	1.76	.309
Prefer not to answer	1.65	.459

Table 8 presents means and standard deviations summarizing #SSChat community members' perceived feeling and recognition of 'sense of community' according to their gender. Findings indicated that on average, #SSChat community members from each gender group fell between *somewhat* and *mostly* when asked how important it is for them to feel a 'sense of community' with other community members. Male community members, female community members, and community members who preferred not to disclose their gender yielded relatively balanced means. Community members identifying with "Other" yielded the lowest mean (M = 1.39). We then ran an ANOVA test to determine significance in perceived 'sense of community' in relation to gender. The results indicated no statistically significant effect, [F(3,162) = .402, p = .752].

Table 8. *Perceived 'Sense of Community' According to Gender*

Gender	Mean	SD
Male	1.71	.437
Female	1.70	.450
Other	1.39	.913
Prefer not to answer	1.73	.312

Table 9 presents means and standard deviations summarizing #SSChat community members' perceived feeling and recognition of 'sense of community' according to their age range. Findings indicated that on average, #SSChat community members from each age range fell between *somewhat* and *mostly* when asked how important it is for them to feel a 'sense of community' with other community members. Community members in the age ranges of 22-29, 40-49, and 60-69 yielded the highest means and they were relatively balanced. Community members in the age range of 70-79 yielded the lowest mean (M = 1.47). We ran an ANOVA test to determine significance in perceived 'sense of community' in relation to age. The results indicated no statistically significant effect, [F(5,160) = 1.220, p = .302].

Table 9. *Perceived 'Sense of Community' According to Age Range*

Age Range	Mean	SD
22-29	1.74	.391
30-39	1.63	.444
40-49	1.83	.428
50-59	1.68	.405
60-69	1.80	.166
70-77	1.47	.383

Table 10 presents means and standard deviations summarizing #SSChat community members' perceived feeling and recognition of 'sense of community' according to their education level. Findings indicated that on average, #SSChat community members from each education level fell between *somewhat* and *mostly* when asked how important it is for them to feel a 'sense of community' with other community members. Community members who hold a doctoral degree yielded the highest mean (M = 1.83), while community members who hold a bachelor's degree yielded the lowest mean (M = 1.46). We ran an ANOVA test to determine significance in perceived 'sense of community' in relation to education level. The results indicated a marginally significant effect, [$F(4,161) = 1.974$, $p = .101$].

Table 10. *Perceived 'Sense of Community' According to Education Level*

Education Level	Mean	SD
Bachelor's	1.46	.439
Master's	1.72	.429
Education Specialist	1.66	.337
Doctorate	1.83	.462
Prefer not to answer	1.74	.251

Table 11 presents means and standard deviations summarizing #SSChat community members' perceived feeling and recognition of 'sense of community' according to their geographic context. Findings indicated that on average, #SSChat community members from each geographic context fell between *somewhat* and *mostly* when asked how important it is for them to feel a 'sense of community' with other community members. Community members in all geographic contexts yielded relatively balanced means. We ran an ANOVA test to determine significance in perceived 'sense of community' in relation to geography. The results indicated no statistically significant effect, [$F(3,162) = .193$, $p = .901$].

Table 11. *Perceived "Sense of Community" According to Geography*

Geography	Mean	SD
Rural	1.72	.382
Urban	1.71	.462
Suburban	1.68	.447
Other	1.76	.363

Table 12 presents means and standard deviations summarizing #SSChat community members' perceived feeling and recognition of 'sense of community' according to their professional identity. Findings indicated that on average, #SSChat community members from each professional identity category largely fell between *somewhat* and *mostly* when asked how important it is for them to feel a 'sense of community' with other community members.

Community members who identify as teacher leaders, education consultants, former teachers, as well as community members who identify with "Other" yield the highest means and they were relatively balanced. We ran an ANOVA test to determine significance in perceived 'sense of community' in relation to professional identity. The results indicated no statistically significant effect, [F(10,155) = 1.095, p = .369].

Table 12. *Perceived "Sense of Community" According to Professional Identity*

Professional Identity	Mean	SD
Administrator	1.62	.0
Education Consultant	1.83	.235
Education Non-Profit Representative	1.73	.271
Educational Technology Specialist/Coach	1.62	.110
Former Teacher	1.83	.0
Museum Educator	1.95	.0
Social Studies Curriculum Specialist/Coach	1.54	.501
Teacher	1.73	.417
Teacher Educator/Higher Education Faculty	1.51	.471
Teacher Leader	1.98	.543
Other	1.95	.291

DISCUSSION

In this study, we aimed to respond to gaps in the literature concerning the potential differential impact that social media-based PLCs like the #SSChat have on community members. Thus, we explored the #SSChat Twitter community's membership by seeking first to understand *who* community members are, and then how their demographics affect their perceived 'sense of community.' Though our analysis of the data yielded no statistically significant findings, the descriptive statistics still provided valuable insights that allow us to contribute to a more sophisticated understanding of the #SSChat community.

According to data collected between 2018-2020 by Organization for Economic Co-operation and Development (2022), roughly 14% of secondary teachers in the United States of America were below the age of 30, nearly 28% were between the ages of 30-49, and approximately 31% were above the age of 50. According to data collected in late 2018 by the

Pew Research Center (2019), the percentage of Twitter users in the United States by age range was as follows: 29% were between 18-29 years, 44% were between 30-49 years, 19% were between 50-64 years, and 8% were 65 years or older. When compared to the demographic data collected from #SSChat members, we find that the age range of #SSChat members seems to mirror that of the larger population of Twitter users, with perhaps a slight increase for those in the age range of 30-39 years. However, the largest pool of secondary teachers in the U.S. (i.e., 50+ years) are not actively involved in #SSChat community. Even early career teachers seem to not be involved on Twitter very much. Of course, this is more indicative of general Twitter practices and demographics than social studies teacher demographics, but it does bring about questions related to the long-term viability of #SSChat. Additionally, what impact might newer social media sources such as Instagram and TikTok have on the #SSChat community?

When it comes to gender, the Pew Research Center (2019) indicated that Twitter users were evenly split between males and females at 50%. Yet, our data indicated a lower percentage of male members (36.7%) in the #SSChat than female members (42.2%); although, we did have a significant percentage prefer not to answer (19.9%). Data from Organization for Economic Co-operation and Development (2022) suggests that the majority of secondary teachers in the U.S. identify as female (62.5%), which might help explain the findings.

Data collected from 2017-2018 from the National Center for Educational Statistics shows that the vast majority of teachers in the United States identify as white (79%) as compared to Black (7%), Hispanic (9%), Asian (2%), American Indian/Alaska Native (1%) and two or more races (2%) (Irwin et. al, 2021). The data on the #SSChat membership indicates that a surprisingly high percentage of social studies teachers who identify as Black participate in #SSChat (12.7%) compared to the overall demographics found in teachers. On the other hand, there is little participation from social studies teachers who identify as Hispanic (2.4%) despite a similar overall demographics found in teachers. As for general Twitter users, 60% identify as white, 11% as Black, and 17% as Hispanic. Researchers need to conduct further research to determine what draws the high percentage of Black social studies educators to Twitter and the #SSChat membership. Conversely, why are Hispanic teachers not involved the #SSChat despite a higher percentage of Twitter users compared to Black Americans?

According to the Pew Research Center (2019), a large percentage of Twitter users indicated that they are a college graduate (42%), which should include every teacher in our data. What is of interest, however, is the high percentage of "Teacher Educators/Higher Education Faculty" (14.5%) that are part of the #SSChat membership. We wonder if we might find similar proportions within more traditional in-person PLC groups, such as state or national councils for the social studies. One question this leads to is to what extent is the participation rate of #SSChat members tied to advance degrees? Additionally, there was a relatively low percentage of Curriculum Specialists/Coaches that participated (2.4%) in the #SSChat membership but is this more indicative of a small job pool compared to other identities? That is, many school districts lack having a dedicated social studies specialists/coaches position, Finally, geographically,

teachers who identified as living in rural, suburban, and urban locations participated in the #SSChat in about equal proportions. Again, it might be beneficial to know what the geographic distribution looks like for traditional in-person PLCs.

CONCLUSION

According to a 'Sense of Community' Theory (SOC) framework, we were able to determine that social studies teachers who participate in the #SSChat have *somewhat* strong perceived sense of community, despite it being a virtual-PLC formed on social media. The findings indicated that there was no statistically significant difference in #SSChat members' perceived SOC based on their self-identified ethnicity, gender, age, education level, geography, or professional identify. Still, the descriptive statistics based on the demographic data tells us a lot about *who* utilizes Twitter as virtual-PLC. We know that the #SSChat members are predominately white; however, there is a larger proportion of Black social studies educators who participate then there is within the larger proportion of the teaching profession. We find that the majority of the #SSChat members are in their mid 30s to late-40s, which is similar to the average age of Twitter users. Leading to questions about future viability of the Twitter as a thriving virtual-PLC platform. We also noticed that a larger than normal proportion of #SSChat members identify as teacher educators or higher education faculty. Perhaps indicating that those with advanced degrees are more inclined to interact on Twitter than others.

One thing is clear, social media is not going anywhere but understanding the demographics of who uses what virtual-PLC service is important. We found that this data not only helps researchers understand who is utilizing social media as a virtual-PLC but it has helped generate future research ideas. Furthermore, may help resource managers, curriculum developers and educational providers more easily and better target audiences.

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