Representing Physical Education in Social Media: A Summative Content Analysis of A School Subject Through Big Data Analytics

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Abstract: The purpose of the current study was to analyze social media content related to physical education. In the context of summative qualitative content analysis, I took advantage of big data analytics to access the data. Machine learning of this big data mapped the large content volume from four major social media platforms. The data was collected by extracting social media posts from January to December 2020. The big data analysis process sorted, categorized, and classified the enormous data into several preeminent topics regarding PE. These computerized analyzes were used to identify themes that were further analyzed using qualitative methods. The results revealed two overarching themes. These themes were (a) PE representation as a school subject and (b) the images of PE teachers on social media. The second theme consisted of three subthemes: masculine traits of PE teachers and negative and positive sentiments toward these teachers. I concluded that key aspects of PE discourse in virtually mediated reality share topical characteristics with what people have previously socially constructed. However, the themes offer a new addition to the literature in that the analysis offers a new perspective on ongoing debates about the social construction of PE through enormous large data sets.

Keywords: *Big data analytics, content analysis, physical education, social media.*

Introduction

Social media has recently become a reality through which some societal aspects are virtually organized and acted. This reality includes the digitally mediated construction of reality, such as physical education (PE). Following Leeds-Hurwitz's (2009) line of thought, the social construction of PE refers to the conceptualization that the meanings of this school subject are not taken for granted but are constructed by social agents. Indeed, the social construction of this school subject has been studied in different historical periods and sociopolitical contexts (Kirk, 1992). Kirk (2009) continued to argue that PE has no essential meaning because it constantly changes over time. This argument that PE is a social construction forms the basis for the present study. However, the development of today's advanced technology allows people to construct the meaning of PE electronically through social media. Therefore, it was necessary to analyze the social media content that contributes to the social construction about and around PE.

Literature has abundantly informed on how people have socially constructed PE despite not explicitly using a theoretical framework from social constructionists. Studies focusing on the perspectives, views, attitudes, beliefs, and claims regarding PE by different social agents reflect the social construction of the school subject. For example, students' perspectives may come from PE experiences which can range from positive to negative experiences (Lyngstad et al., 2019). A study exploring students' experiences of being seen by their teachers showed that dimensions in PE such as constructive feedback, respect, and trust have contributed to positive experiences. At the same time, negative experiences might emerge from being seen or ignored by the teachers, which would result in experiencing lesson demand or difficulty. Additionally, an arbitrary relation between PE and sports that has commonly existed in many societies allowed students to see PE as a sport (Stirrup, 2020). Since some also tended to see sports positively offering leisure and enjoyment, children and their parents showed a positive attitude toward school PE, even if they did not comprehend the subject's content (Coulter et al., 2020).

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Other social agents directly interacting with PE are the teachers and teacher educators. Being considered positive (Barney & Deutsch, 2009), teachers viewed PE as having multiple purposes covering such developmental aspects as psychomotor, cognitive, and affective domains, which were especially more apparent among early childhood teachers (Tsangaridou, 2017). Despite the trend of viewing PE as having various advantages, a review of the literature showed that there existed empirical evidence suggesting only the psychomotor contribution of PE, especially toward students' skill development and physical competencies (Bailey et al., 2009). Other domains, such as the social and affective domains, were mediated by fluid dimensions ranging from environmental to leadership aspects of PE learning. These are examples of how discourses about and around PE can construct the meaning of the school subject.

Moreover, in today's society, the discourses of PE are electronically mediated. Since the concept of social construction considers the co-construction between different social actors, research in this area could be challenging. Researchers may want to consider the numerous sources available online. For example, a document study that focused on various electronic resources on PE and school sports revealed the seemingly ambitious claim that they are the foundation of the community (Habyarimana et al., 2022). While this claim might lack suggestive evidence, all of those varieties of documents that they studied have represented people's discourse about PE, in other words, social construction. Hence, the proliferation of social media in today's society has become an important outlet in which the meaning of PE is contested. Despite the information being conveniently available in educational literature (e.g., Afacan & Ozbek, 2019; Otchie & Pedaste, 2020), PE scholars still tend to pay less attention to this particular study area. The exception includes the studies of Bopp et al. (2019), Brooks and McMullen (2020), Goodyear et al. (2014, 2019), Goodyear and Armour (2018), Harvey and Pill (2019), and Richards et al. (2020).

Studies on this specific topic have predominantly covered teachers' use of social media. For instance, a research project showed that pre-service PE teachers saw the value of incorporating Twitter into their curriculum, especially when addressing learning components such as autonomy, relatedness, and competence (Hyndman et al., 2020). Similar findings appeared in other research involving PE teachers who utilized Twitter to foster a sense of community within their professional network, lessen feelings of isolation, promote these teachers' initiative-taking, and advance their professional growth (Brooks & McMullen, 2020; Goodyear et al., 2014, 2019; Richards et al., 2020). The use of social media content as a resource for PE instruction has also been studied. Social media has the potential to be a source of health-related knowledge and physical literacy (Bopp et al., 2019; Brooks & McMullen, 2020; Goodyear et al., 2019).

However, less attention has been given to studying social phenomena through examining social media despite the increase in enthusiasm among PE researchers to focus on it. Examples of this type of social media research include a study on the representation of PE practices from 27 societies analyzed from YouTube videos (Quennerstedt, 2013). Another example is the study of the formation of daily philosophies about physical literacy among PE teachers through Twitter chats (Harvey & Pill, 2019). The current study was an attempt to examine social media data to look at the social construction of PE; therefore, it is considered a social phenomenon. This phenomenon could be rewarding since an authentic construction of PE could be portrayed from laymen's thoughts, perspectives, and experiences being represented in social media.

Endeavors to understand the electronic construction of PE can take advantage of big data analytics. Big data analytics is a recently developed field of computer science that benefits researchers in other fields of study from data handling, extracting, and analyzing enormous amounts of data (Kitchin, 2017). Data visualization, machine learning, sentiment analysis, and other algorithmic techniques are part of big data analytics. Big data is different from typical dataset management and processing because of the enormous volume, high velocity, and wide variety of this decoded information. The vast data from social media users is a treasure that researchers can use to describe social phenomena. Although some researchers have doubts about this machine-processed data, others suggest incorporating qualitative methods into big data analytics (e.g., Mills, 2019). Summative content analysis is among the appropriate methods for studying social phenomena through big data analytics, in which researchers explore latent meaning after quantifying the data (Hsieh & Shannon, 2005). This qualitative study sought to depict PE in social media by analyzing empirical online material previously processed using big data Analytics.

Methodology

Research Design

The current research was a qualitative study focusing on analyzing social media content. I employed summative content analysis (Hsieh & Shannon, 2005). As part of social media research (Sloan & Quan-Haase, 2017), the study paid attention to human action represented in social media.

Sample and Data Collection

The current study collected data by extracting posts from four major social media platforms in Indonesia, including Twitter, Facebook, Instagram, and YouTube. Data included all content generated by social media users, such as microblogs, images, videos, and links. I also considered the users' engagement through re-tweets, mentions, hashtags, shares, and likes. I utilized a big data analytics platform for social media provided by ebdesk.com. This platform required

paid access to their service, and my position was merely a consumer of their analytics. Their analytics framework offered data science processes through which data are acquired from social media, stored in their repository, then processed and analyzed through machine learning algorithms. At the end of this knowledge management system is consumable data visualizations. In particular, I had no authority other than consuming the products of their computation of social media data. In this study, I designed two steps for collecting data.

First, to start collecting data from big data analytics, I identified a set of words commonly used to call physical education. These words were in Bahasa Indonesia, which was equal to "physical education," "health and physical education," "PE," "HPE," "physed," "sports lesson/learning," "gym class," and "physed/sports teachers" if being translated in English. The machine learning was able to extract posts that contain at least one of the query terms. Because of the Indonesian query words, it produced extracted materials that were also in Bahasa Indonesia. Additionally, our search terms restricted the postings to primarily coming from Indonesia, reflecting the school subject in Indonesian contexts. A number of 19,171 posts have been pulled out from the four most popular social networking sites by the initial query. The algorithm also classified these topics according to the most discussed topics by the users. Quantitatively, the counts of words related to PE teachers were placed at the top. It was then followed by topics regarding PE learning (16.6%) and students (8.2%). Other topics were virtually equally valued (approximately 7%). Interestingly, these were the most popular themes; other topics may have existed but were hidden by big data analytics due to their small counts. Nearly half of all top issues were devoted to PE teachers. It could mean that the rhetoric of physical education centered on teachers. The contents of these top three issues and those involving PE learning and students were further examined using a more in-depth qualitative methodology. Despite irrelevant data, most of them were robust information to serve the purpose of the study. Therefore, qualitatively analyzing all of the data was not an option. So, I had to be selective by focusing only on the top three topics. Therefore, summative content analysis became the relevant methodological choice for the current study.
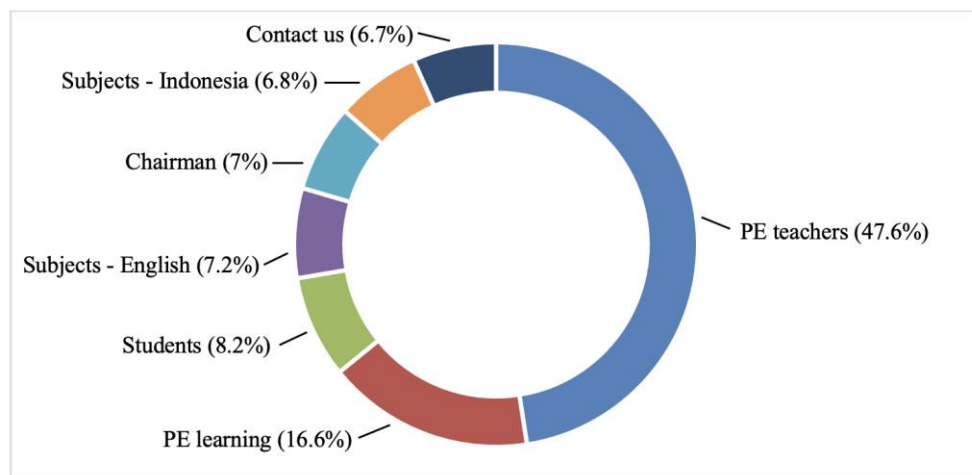

Figure 1. Top Seven Topics of Social Media Contents about Physical Education Generated from Big Data Analytics.

Second, I collected qualitative data by looking at the top seven topics regarding physical education being identified by big data analytics (see Figure 1). This machine automatically determines the topics and the rank for each topic based on the query words through which the social media users have engaged in discussions and comments. The machine also provided examples of the contents of social media posts which were collected for further qualitative analysis. I reviewed the contents of these topical categories, merged some of the similar ones, and limited them to the top three issues for further qualitative content analysis. In order to thicken the data, I focused on small but in-depth data by selecting the most favored posts, and comments within each topic as the machine ranked them. This data also meant that only central topics were taken into consideration. More specifically, it was considered thickened because the favored posts tended to be engaged by social media users through re-tweets, mentions, likes/dislikes, shares, comments, and replies. These engagement actions, one way or another, reflected the thickness of the data. Another strategy for thickening data included maintaining the native format of how the data looked like. I did it by accessing the links to the contents and capturing the web pages into a portable document format (PDF). The last strategy was to consider all digital traces, including texts, images, and social media symbols of engagement activities. In this stage, I collected 292 PDF files containing posts with textual (i.e., microblogs, tweets) and visual (i.e., images) representations. The files also included user engagement, comments, likes, and shares. Audiovisual contents were analyzed separately, but later the applied codes were incorporated into the PDF files. Finally, the collected data were managed for further analysis in a Computer Assisted Qualitative Data Analysis Software (CAQDAS) called ATLAS.ti 22.

Analyzing of Data

Qualitative researchers have thus far commonly been practicing content analysis strategies for their data analysis. Although various techniques exist, three major distinctions in coding procedures cluster around what falls under conventional, directed, and summative approaches (Hsieh & Shannon, 2005). Conventional content analysis is inductive, which begins the analysis bottom-up from the data. On the other hand, the directed content analysis is more deductive, through which a coding system developed from existing theory is established at the outset. At the same time, the summative content analysis starts with quantifying words or concepts in the data to produce categorization or a cluster of meanings. Hsieh and Shannon (2005) mentioned that an in-depth, latent analysis of qualitative information in the data then follows the summative approach. This approach is promising when researchers deal with extensive qualitative data. For this current study, it was beneficial when the researcher accessed the data from big data. The machine learning analytics performed algorithmic processes to identify, extract, manage, analyze, and present social media data prior to the qualitative analysis by which researchers as human instruments take complete control over the analysis process.

After quantification by machine learning, latent qualitative content analysis was performed with four steps. These steps were decontextualization, recontextualization, categorization, and compilation to identify the underlying meanings of the contents (Bengtsson, 2016). In the decontextualization step, I began by familiarizing myself with the data by reading through the data to get a sense of the whole data. I continued the decontextualization step by assigning codes inductively on the meaning units (data segments) and then developing a coding system (list of codes). The next step included recontextualization, by which I reread the verbatim textual data together with the coded meaning units. In this process, I reviewed uncoded data and reexamined if they might help answer the research questions. The following step was categorization, in which I specifically reviewed the list of codes alongside the collections of meaning units under each code. Also, at this analysis level, categorization was performed by grouping codes considered homogenous into categories. Finally, the compilation step was done through post-coding analysis, in which codes and meaning units within each category were reviewed. I also developed a thematic map within the data by linking entities in the data (e.g., meaning units, codes, code categories). At the end of this step, the eligible topics were identified, and the final central topics were created. All of these processes were aligned with the research questions. Additionally, I used Computer Assisted Qualitative Data Analysis Software (CAQDAS) from ATLAS.ti 22 to help with data management, organization, retrieval, and visualization.

Strategies to accomplish trustworthiness criteria were established to ensure the data analysis quality. Firstly, credibility concerns how the analysis process represents reality (Schwandt, 2007). Despite being anchored in different epistemological grounds, credibility is often paralleled with validity in quantitative methodology. Credibility in this particular study was achieved through familiarizing with the data before conducting formal coding (Braun & Clarke, 2021). Additionally, I developed a researcher's reflexivity to help prevent my imagination contamination during the data analysis process. The second criterion included dependability and confirmability, which might be aligned with reliability. Schwandt (2007) described that researchers could accomplish these criteria by ensuring that the analysis process is logical, traceable, and documented. I was assisted by programmatic features in ATLAS.ti 22 that automatically recorded the analysis along with the time stamps and analytical actions.

Results

Two overarching themes have been constructed from the analysis. These themes described social media content through in-depth qualitative analysis. The first one included the representation of PE in social media. The second theme focused on how PE teachers are discussed in social media. More specifically, the last theme consisted of three sub-themes: the portrayal of PE teachers as having masculine traits and negative and positive sentiments toward PE teachers. The following subsections present the results of the study.

Representing the School Subject: Physical Education in the Age of Global Pandemic

Analysis of the users' posts resulted in constructing the first theme, which is the representation of PE as a school subject. Since data collection had been done during recent years, the pandemic became a critical context for this study. Concerning the health measures for COVID-19, distance learning has been implemented in major areas in the country. The representation of PE considerably reflected this condition. The following paragraphs describe how PE has been represented in four social media platforms.

Social media users have represented PE by posting their opinion about the school subject, specifically the student learning in PE. These opinions ranged from academic perspectives articulating the definitive concept of PE to more layman's perspectives. For example, an academically sound post on Instagram stated, "physical education is a school subject that encourages the development of motoric and physical skills, knowledge, sportsmanship, healthy living habits, and character-building (mentally, emotionally, spiritually, and socially) in order to accomplish the goals of national education." Despite the apparent representation of these scholarly contents, most social media users consider it an easy subject matter. A Facebook user posted her experience of learning PE,

I liked gym class very much 'cause I was a student-athlete for my high school basketball team, though I only played at a district level ha ha ha. Gym class did not use your brain, but your energy (laugh out loud emoticon). So, I enjoyed it. My least favorites were math, physics, and chemistry. I hated those.

This post was engaged by 84 users, mostly by giving likes and sharing the post. A number of 33 users also commented on the post, predominantly showing agreement with that statement. In addition, the layman's perspectives about PE included the opinion that the school subject possessed physical and athletic qualities. A long post about one politician informed that he was a physical person by stating, "He always carried a soccer ball whenever he went around, although it was not PE class." At this point, the account owner posted the depiction of physicality through sport and PE to be added to his image as a politician. Another example was a prominent soccer player in a local team whose picture became the cover of an elementary PE textbook. The issue of this textbook cover had been rapidly circulated among and highly admired by his fandoms. In other words, such a textbook cover underlined that elite athleticism was one of the prominent natures in PE.

In addition to the opinion about PE, social media also portrayed how PE had been taught, especially during the pandemic. Social media posts predominantly exposed learning events of distance PE. Some of these posts were teaching activities seemingly posted by teachers publishing PE content such as sports skills (i.e., basketball, soccer, volleyball, badminton), exercise activities, and health (i.e., coronavirus disease, immunity). Fundamental motor skills and gymnastics seemed to be the main PE content for elementary students. Furthermore, the analysis showed that audiovisual content from YouTube was commonly posted for learning about movement skills. Some teachers produced the videos alone, and others took advantage of the available content relevant to their units.

Concerning pedagogy, the quarantine measures implemented in the first months of the pandemic played out in pedagogical confusion about how to deliver content remotely to the students. For example, a social media user who appeared to be a teacher posted information about COVID-19 as PE content of the day. After a long post, this teacher provided a closing statement indicating a lack of understanding about how such content should be delivered. He hoped his/her friends on Facebook would help him/her deliver the post to the students.

For parents or residents of Bumiland village who happen to read this post, please give this learning material to our students or neighbors. My apology for teaching the health unit this way because of the current situation and condition. Sixty percent of my students already got this material; maybe with this posting, I could reach 100% of them.

When the new academic year began in August, some teachers expressed that they started to get adapted to the new normal. This normal was especially true for those who participated in professional development programs designed to help teachers with skill development regarding online teaching. An example was a Facebook post stating, "Not ready or shocked by the condition that forces us to teach PE virtually. I used to neglect students' condition, backgrounds, and learning styles, so I had taught them according to what I wanted, according to my ways." After participating in government-facilitated workshops, this teacher acknowledged that he had developed new knowledge and pedagogical skills to work with the students in online environments and engaging, student-centered ways of learning.

On the family side, the distance learning during the first months of stay-at-home order had become new experiences and stories worth sharing on social media. Parents had actively posted visual, audiovisual, and microblogging textual content about their children's learning activities. Some posts sounded to be showing off genuine learning activities. For example, a father uploaded a post consisting of four images of him and his wife helping their son to practice physical skills. He wrote, "Accompanying Husnie, who was on-task for HPE from home. Many positive sides we can do while #stayathome, one of those is to boost the immunity." Some other posts might be less authentic, especially for the users who had to leave home to work. An example was a post by a mother stating, "To be underlined here: stu-dy-at-ho-me, all right! Not a vacation. This is a mom image: clean up the area, the table, no pillows around, move those books away a little bit, then 'click' (followed by the camera and laugh-out-loud emoticons). Moms' job before going to work (another laugh-out-loud emoticon)." She posted her student doing PE learning just because everyone else did it while she could not help her child study at home.

Mothers, in particular, felt they needed to provide resources to support meaningful learning, especially for elementary-aged children. Some resources included time and effort to teach their children despite lacking formal teaching skills. For example, a post on Facebook informed that a mother had difficulty understanding the curriculum, "Moms becoming a teacher at home have to understand the map of basic competencies. You will get a tummy ache, won't you, Mom? The most painful one is HPE." Another mother made excuses to her daughter, "Today, I became a PE teacher; I am so sorry if mom could not be like your PE teachers at school. My sports are cooking, doing laundry, washing dishes, mopping the floor, and laying around." Being posted as a new experience, however, the analysis showed complaints plagued the second half of 2020. Parents might begin to realize that some schools did not deliver PE that helps students learn the units, and parent teaching was in effect after all. A mother wrote a protest post addressed toward the local administration. She said, "In PE, students are asked to kick the ball. Then, photos were taken. Submitted. It is impossible for me to become a PE teacher. How is my kid supposed to learn this way?"

The Image of PE Teachers in Social Media

The data showed a substantial depiction of PE teachers, which was also the first top representational topic in social media. Further analysis also resulted in three sub-themes. They are (a) PE teachers' portrayal of having masculine traits; (b) social media users' negative sentiments; and (c) positive sentiments toward PE teachers. This representation seemed to be in contexts beyond the global pandemic.

The portrayal of PE Teachers as having Masculine Traits: The first sub-theme included the commonality of the masculine depiction of PE teachers in social media. Analysis informed that male users tended to locate PE teachers as role models for their masculine ideals. The depiction included strong, rough, tough, assertive, directive, dominant, and competitive. On National Teacher's Day, one user wrote a letter of appreciation on his Facebook timeline, "Mr. Sarji was the lion teacher, the coolest PE teacher ever." The term lion was intended to describe his masculine traits while simultaneously adding the adjective "the coolest" to admire such masculinity. Similarly, female users in the data portrayed PE teachers as favoring masculine appeals. For example, a graduate from a vocational school expressed her memory of school days back then, "When in VET, we once celebrated one of our favorite teachers. I still remember how handsome our PE teacher was." Aspiring to go back to school after long-distance learning, a middle school student posted, "I missed Mr. Trimo's throat-clearing when he was teaching PE, 'ehemm' he he he."

Along with masculinity, physicality and athleticism had often been used to illustrate PE teachers. A college student majoring in PE teacher education posted his two images side by side; one was when he was a little child, and the other seemed to be the current picture. A segment of his stories informed a fine-grained description of his physicality concerning his future job.

> I sometimes feel bad when I remember my childhood: small, skinny, toothless, and sickly…being in and out of the hospital, a loyal customer of Anthony Hospital, belittled by my PE teachers in elementary cause of my weak body. But eh, I will be a PE teacher soon. Thank God I have a healthy body and am always physically active.

Additionally, athleticism underpinned posts about a strong connection between PE and sport. Some local sports clubs on their social media platforms also announced the news about their players, who were also PE teachers. For example, Banaran Football Club posted an image of a player through their Instagram account and stated, "We have interesting news about our captain @gafur_lantip, a Banaran native, our best player. He is also a PE teacher in High School 001 with a bunch of athletic achievements and experiences." Another example was a Twitter user who replied to a tweet advertising a second-hand pair of sporty sneakers. He responded, "For teaching, cause I am a physed teacher."

Negative Sentiment toward PE Teachers: Second, social media users expressed their sentiments toward PE teachers negatively, especially after cases of sexual abuse. A long post by a user who self-identified as an educational practitioner provided data that there were 21 cases of sexual abuse in 2019 by educators. About a quarter of those cases involved PE teachers. Big data analytics also revealed the two most widely engaged cases in 2020. One case was the arrest of a PE teacher accused of abusing more than 30 students. The other was a rape case of a middle school student that resulted in pregnancy. Social media users explicitly expressed their anger on various platforms. For example, a tweet shared a local news piece about this issue and commented, "Abusive is abusive; there is no reason for mutual love. He is an adult and supposed to know it is wrong to do it with a minor." When an Instagram user posted another piece of news that the victim delivered the baby through cesarean section, the post engagements reached up to 1,900s. It is worth noting that these large numbers of engagement affirmed the immensity of such negative portrayals of PE teachers. Further data analysis also revealed that those engagements had validated prolonged negative sentiments. An example included a typical comment like "PE teacher in my old school was also the worst abusive human being."

Positive Sentiment toward PE Teachers: The last sub-theme described a more positive tone and recounted PE teachers as casual, friendly, and favorite. This sub-theme was mainly formed by posts centralized around two major trending topics. The first topic included this widely-quoted text: "you can cheat on the test, but do not be noisy." Such a saying seemed to be circulated throughout all platforms, highly engaged by the users, represented in various forms of media, and existed as long-standing content. This statement's context was when PE teachers were supervising written exams. There was no clue about the origin of this statement and its actual meaning. For example, a Facebook user expressed, "It still becomes a mystery: why every PE teacher lets us cheat on the exam as long as we do not make noise." Analysis of the social media users' comments on the posts containing such statements revealed that PE teachers had been represented as casual, easy-going individuals. When PE teachers were around, examinations were not that scary. One commented, "God bless PE teachers! You're my hero." It was expressed because PE teachers assumed to indirectly help him/her with improving the test score average. The second trend included the timeframe around National Teacher's Day on November 25. Together with teachers of other subjects, PE teachers harvested appreciation from parents, students, and graduates. However, the specific appreciation posts for PE teachers tended to acknowledge them as sociable individuals. For example, an account owner on Twitter tweeted, "Hi y'all, happy teacher's day to all teachers in the country. Let us share your experience with PE teachers." This tweet got 87 engagements informing that PE teachers had been represented as generous and friendly teachers. Some other users also took advantage of the appreciation day to acknowledge PE teachers' roles in facilitating their current accomplishments.

Discussion

This current study's summative qualitative content analysis began with quantitative processes through Big Data analyses. The result was the content that social media users used when discussing PE. These topics were PE teachers, PE learning, and students, which could reflect the importance of these three aspects in PE discourse. In addition, it became clear that PE was a gendered topic on social media, especially through the masculinization of PE teachers. This social construction of PE is not surprising, as the dominance of masculinity in and around PE has also been conclusively demonstrated in the literature (e.g., Campbell et al., 2018; Parker & Curtner-Smith, 2012; White & Hobson, 2017).

Following Hall's (1997) classical theory, social media content can be considered a meaning-bearing representation. This inclusion was essential to this study, which qualitatively examined the meaning of social media content after it had been sorted, ranked, and classified by the algorithmic processes. This was especially evident in the quantification of extremely gigantic data. In this current study, Big Data analysis through computer programming helped manage and present data analysis that would otherwise be difficult to achieve with layman's computers. However, the literature has informed the benefits of qualitative analysis in combination with Big Data analysis (Davidson et al., 2019), mainly those analyses that provide examples of social media content (Karamshuk et al., 2017). The research design of this study allowed the analysis to go in depth in interpreting the meanings of PE. As a social construct, the meaning of PE tends to vary among social media users as they may have different PE experiences. However, qualitative content analysis enabled this study to identify clusters of meaning in social media posts and comments. These clusters of meaning were the absence of academic characteristics in PE and the centrality of physicality in the matter. The current study may not add much to our current understanding. Previous studies have referred to the literature on the meaning of PE (e.g., Hyndman et al., 2020; McEvilly et al., 2015; Mikalsen & Lagestad, 2020). However, this research provided knowledge reproduced from an alternative process using social media content that users expressed publicly: not because of an interaction with the researcher. It could authentically reflect their ideas, dispositions, and perspectives via PE. In other words, the qualitative content analysis of the study could demonstrate the credibility of exploring the meaning of PE among lay people. Social media users also made their thoughts and feelings known when they posted about PE teachers. As in other societies, teaching is generally a respected profession in Indonesia. However, I learned from a critical study by McCullick et al. (2003) about seemingly negative depictions of PE teachers in movies. Considering Hall's (1997) theory, such a cinematic representation can be fictional or real. This is also true for the present study, in which PE teachers were portrayed negatively. In contrast to the fictional portrayals prevalent in movies, the portrayal of PE teachers in social media refers more to reality. More specifically, the negative sentiments were due to cases of child abuse committed by PE teachers. It is worth noting the local context of these proliferative sentiments. Laws to protect children from sexual abuse have only recently been created in Indonesia and have not been systematically enforced (Saputra & Soponyono, 2019). There is also a lack of systematic policies and programs to ensure the safety of children from sexual offenders in educational institutions. As a result, schools are exposed to the likelihood of individuals with a history of child abuse entering the teaching market. The social construction of these negative sentiments in Indonesia may have its origins in this situation.

It may be worth noting that the data extraction occurred during the pandemic period. Social media content about PE was also shaped by the discourse about COVID-19 and its impact on PE. When the school closed, social media users seemed unsettled by the sudden shift to virtual learning. Although most subjects were converted electronically to distance learning, physicality within PE made this transformation more challenging for teachers, students, and parents. It has also been previously studied that pre-service teachers experienced the disruption in a way that required them to distance themselves from their students (Varea & González-Calvo, 2021). Another study also informed the challenges of transforming physical experiences into electronically mediated learning experiences in PE (O'Brien et al., 2020). The obligation to teach PE electronically left teachers with a sense of anxiety.

Conclusion

Studies on social media will help further knowledge development, particularly on the meaning of PE. This study can make an essential contribution to the meaning of PE by considering the social constructivist paradigm from the beginning. In this sense, the study can show how people in a society collaboratively create what PE means to them and what they think is the reality of PE. People co-constructed physical education using social media platforms, focusing on topics such as PE teachers, PE learning, and students. Further research revealed typical PE representational tones, including physicality and masculinity. Social media users expressed both negative and positive sentiments in portraying PE teachers. The main findings of the analysis may be consistent with what has been conclusively presented in the literature. However, there are new findings as I learned about the socio-political events in society. These events can affect these settings and influence what and how PE-related themes have become the discourse. The current pandemic has also created a global background on how PE has been implemented locally, reflected in social media content.

Big data analytics has made it technically possible to concisely extract, analyze, and present gigantic amounts of data. The current study also began with such a vast data set. Without big data analytics, processing such massive amounts of data using conventional data processing methods would be nearly impossible. When this was chosen as the focus of a qualitative study, it had the potential to provide new insights into what was previously known in the literature or perhaps discover new information in the field of educational research. Further research could replicate the current study and

employ theoretical and methodological variations to add to the literature. Given computer science's rapid dynamics, similar studies should incorporate this development shortly.

Recommendations

The study promises new insights into how laymen's perspectives have constructed school subjects. Follow-up studies could be conducted with the same focus but with different methodological approaches. For example, scholars may further move into interviewing social media users. Other methods, such as mixed methods, hold promise for explaining how people's construction of a school subject is related to other variables. In addition, the study results can improve educational policy and practice in physical education. Aspects such as student learning in PE and teacher professional development can consider how society thinks and feels about the school subject.

Limitations

Ethical issues were evident in the current study. However, ethics in a new area of research is always a challenge. I practiced ethics based on minimum ethical standards: do not harm (Lahman et al., 2011). Although the current study focused on human action in social media, participants were not included in the same way as in traditional studies. I did not recruit social media users as study participants. Instead, I extracted their digital traces, which were already archived in the databases of social media platforms. Users also agreed to the terms and conditions for using social media services. One of these agreements states that users' data, including their posts and comments, may be used for research purposes. Nevertheless, I have followed ethical procedures to protect their privacy by using pseudonyms and making every possible effort to ensure that their identities cannot be recognized.

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