The Representation of Physical Education in Social Media: From Big Data Analytics to Qualitative Analysis

Caly Setiawan and Muhammad Hamid Anwar

Department of Physical Education, Yogyakarta State University, Yogyakarta, Indonesia

Corresponding author: Caly Setiawan, Department of Physical Education, Faculty of Sport Sciences, Yogyakarta State University, Kolombo St. #1, Yogyakarta, 55281, email: csetiawan@uny.ac.id

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The purpose of the current study was to understand the representation of physical education (PE) in social media. We used big data analytics to access data of the representation and to map out the large scale of representation in four major social media platforms. Qualitative analysis was performed to explore the more in-depth meaning of PE in those social media platforms. The data were collected by extracting social media posts from January to December 2020. This involved big data analytics by which information has been ranked, categorized, and classified through its machine learning. Qualitative data were gathered from the big data analytics providing rank of topics regarding PE. Data analysis included computational analytics producing data visualization and thematic analysis on how PE has been represented in social media. Results showed three overarching themes. These themes were (1) the representation of PE along with its contributors in social media, (2) PE representation as school subject, and (3) the images of PE teachers in social media. We concluded that the themes could be a new addition to the literature in a way that we provided a new perspective on the on-going debates about the social construction of PE through gigantic large datasets.

Keywords: representation, physical education, social media, big data analytics

Introduction

Body of knowledge on school subjects has solidly encompassed a wide range of sociological perspectives. It provides important information on, among others, the place and location of the subjects in societies reflected through people's construction of these areas of learning. At this point, the understanding and meanings of the school subjects are socially created, built, discovered, and negotiated by the members of society. Following the social constructivist's line of thoughts (Berger and Luckmann, 1991; Crotty, 1998), multiple realities of school subjects emanate from the diverse ways of constructing those meanings by different societies.

As one of school subjects, physical education (PE) has long been scrutinized from social constructivist's perspectives. Literature has documented the social construction of dimensions in PE such as bodies, abilities, gender, and identities (e.g., Gorely, et al., 2003; Hay and MacDonald, 2010; Maria González Ravé, et al., 2007; Walseth, et al., 2017). More specifically, these social dimensions have been constructed through educational processes like curriculum development, pedagogic discourse, and assessment (e.g., Evans and Penney, 2008; MacPhail, 2004; Peiró-Velert, et al., 2015).

Furthermore, one emerging process of social construction is also through the electronically mediated representation of PE in social media, online newspapers, films, and other presentations of popular culture. It has been learned from the classic theory of representation that people use language or symbolic systems to communicate the meaning of PE or to represent it toward others (Hall, 1997). As the re/production of meaning, representation can refer to factual or imaginary objects, human beings, or events. Regardless of the nature of its reality, PE representation entails particular interests and agendas from those who communicate it.

Additionally, language is critical within the concept of representation whether it is textual or in broader forms such as in images, audio, and audio-visual. Hall (1997) continued to argue that those forms cannot be removed from the culture in which the meaning is learned, understood, and practiced by its members. In short, representation is the re/production of meaning that relates objects, concepts, and languages which in turn enables us to refer to the world. Underlining the constructivists' framework within the concept representation, meanings are constructed in and through language.

Literature has documented information on the representation of PE in media. For example, Hyndman et al. (2020) studied international media representation about PE

from 2013 to 2018. They found that the media tended to maintain discourse about PE around healthism with notorious highlights on physicality such as activity, health, obesity, physical activity, and exercise. Unlike mass media, Walton-Fisette et al. (2017) focused on PE representation in popular culture. They described that movies containing PE represented images of the subject as an arena for bullying and constructing masculinism. Similarly, representation of PE in movies also constructed images of PE teachers as butches, bullies, and buffoons (McCullick, et al., 2003).

PE researchers have also begun to focus on social media. However, the gap in the literature seems to exist pinpointed from the framework of social media research offered by McCay-Peet and Quan-Haase (2017). This framework delineates two areas of research including (1) the uses of social media and (2) the investigation of social phenomena. Much of PE literature has informed the first area with considerable studies on the uses of social media in the contexts of professional development. For example, Hyndman dan Harvey (2020) showed that preservice PE teachers in their research perceived the value of using Twitter in their program. This was especially apparent through the elements of motivation such as autonomy, relatedness, and competence. Other studies with PE teachers also showed similar results in which teachers used Twitter to develop a sense of belonging within their community of practice, reducing the perception of being isolated, helping these teachers with taking initiatives, and supporting their professional development (Brooks and McMullen, 2020; Goodyear, et al., 2014; Richards et al., 2020). Social media contents have also been investigated as PE learning sources. Some researchers have revealed the potential of social media as the sources of physical literacy (Bopp, et al., 2019) and health-related information (Goodyear, et al., 2018). Meanwhile, little is known about the area in which PE is considered as a social phenomenon being investigated by and through social media.

Few exceptions include Quennerstedt's study (2013) investigating PE practices represented on YouTube in 27 different countries. Harvey and Pill (2018) also looked at how teachers developed their day-to-day philosophy with regard to physical literacy through conversations on Twitter.

Equally important, further social media research on PE may take advantage of big data (Felt, 2016). As a newly emerging field, big data analytics allows researchers to benefit from the handles, extractions, and analyses of datasets that have been digitally left behind by social media users. Big data analytics include algorithm processes such as sentiment analysis, machine learning, and data visualization. This decoded information is characterized by huge volume, high velocity, and diverse variety making big data different from other datasets management and processes (Kitchin, 2017). Furthermore, other scholars proposed to bring qualitative approaches in the studies utilizing big data analytics (e.g., Mills, 2019; Sykora, et al., 2020). This article reported our work with big data analytics to study the place of physical education in one society. More specifically, this qualitative study aimed at understanding the representation of PE in social media through big data analytics. Two research questions were developed to guide the study, including: (1) what are the top representational topics of PE in social media, and who have contributed to those topics? (2) What are the central themes within these representational topics?

Method

Context and ethical issues of the study

The context of the current study was virtual locations in which we studied human action in social media. However, the language of the social media posts as a result of query words in Bahasa Indonesia located online activities taking place in this country. In other

words, this reflected PE in Indonesia. In addition, the time frame of the study was from January to December 2020. Most of the school days during the year were dominated by distance learning due to the COVID-19 pandemic. Although the extracted posts did not always reflect what had happened during this time period, the condition of the pandemic became an important context in which the social media users engaged in online activities.

Ethics in a new research practice is always challenging, particularly in a country in which human-subject protection infrastructures are largely absent (Metcalf and Crawford, 2016). Having trained in Western tertiary education, we maintained minimalist ethical codes yet the non-existence of oversight institutions. Additionally, we considered contextual integrity when traditional codes were not much of help in conducting ethically sound big data research (Nissenbaum, 2010; Zimmer, 2018). We assessed our study with 9 steps of framing the integrity throughout the process of the study.

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 in this current study were contents generated by social media users such as microblogs, images, videos, and links. We also took into consideration the users' engagement through re-tweets, mentions, hashtags, shares, and likes. We utilized a big data analytics platform for social media provided by ebdesk.com. Their analytics framework offers 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 this study, we designed two steps of collecting data.

First, we began data collection with big data analytics by determining a set of query words in Bahasa Indonesia. The query words helped the machine to extract posts containing at least one of the query words. The English translation of these words was "physical education", "health" and "physical education", "PE", and "HPE". The set was also made of ordinary terms commonly associated with the subject such as "physed", "gym class", "sports learning", and "physed/sports teachers". Since the query words were in Bahasa Indonesia, the results of all extracted contents were also in the same language. Our initial query has extracted 19.171 posts from the four major social media platforms.

Second, we collected qualitative data by looking at the top ten topics regarding physical education being identified by big data analytics. This machine determined the topics based on the query words through which the social media users have engaged in discussions and comments. We reviewed the contents of these topical categories, merged some of the similar ones, and limited them to the top three issues for further qualitative analysis. In order to thicken the data, we focused on small but in-depth data by selecting the most favored posts and comments within each topic as they were ranked by the machine. This also meant that only central topics were taken into consideration. Another strategy of thickening data included maintaining the native format of how the data actually looked like. We did it by accessing the links to the contents and capturing the webpages into a Portable Document Format (PDF). The last strategy was to take into account all of the digital traces including texts, images, and social media symbols of engagement activities. In this stage, we collected 292 PDF files containing posts with textual (i.e., microblogs, tweets) and visual (i.e., images) representations. The files also consist of users' engagement including 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 9.

Data analysis

The data analysis took advantage of the machinery analysis performed by big data analytics. This included machine learning algorithms to extract the social media data and process the data through indexing and issue ranking. We carefully selected data that were produced from this simple processing such as the number of posts and engagement activities. In other words, we did not take into consideration the complex analysis involving semantic processing, natural language detection, and relationship detection in which the validity and reliability have still been undetermined. Furthermore, the extraction data was broken down into visualization entities such as demographic information, activities, users' locations, topics, and engagements and then described narratively.

The next step was a more human approach to data analysis. At this point, the researchers had full control over the processes despite a CAQDAS being used to assist the analysis. The qualitative analysis involved a coding process through which segments of the data were coded and a coding system was developed. The next step proceeded with categorizing the codes and naming these categories. Post-coding analysis was performed to produce solid themes on the data. All of these processes have been responsive towards the research questions.

Results

There are three overarching themes that have emerged from the analysis. The first theme is from machinery analytics of the big data presenting information about top

representational topics of PE, the contributors, and the ways they contributed to the representation of PE in social media. The second and third themes are mainly the results of our interpretative analysis of the extracted qualitative data. These are representing the school subject and the image of PE teachers. The following subsections present the results of the study.

Top representational topics of physical education and the contributors

The big data analytics produced data informing topics of physical PE from 19.171 posts. The machine learning algorithm also ranked these topics based on the identification of the most discussed issues. Figure 1 displays the top topics regarding PE. Among these topics, the top three included PE teachers (47.6%), PE learning (16.6%), and students (8.2%). Other issues were shared in almost equal values (approximately 7%). It is noteworthy that these were the top topics and there might be other topics that were not displayed by the big data analytics because of their insignificant counts.

Figure 1.

The representation of PE teachers took up to almost half of the overall top topics. It might indicate that teachers were central within the discourse of PE. Together with the topics about PE learning and Students, the contents of these top three topics have been further analyzed in a more in-depth approach using qualitative data analysis and are presented in the second and third themes.

Who were the contributors and how they contributed to these representational topics? The big data analytics extracted posts being contributed by 14.324 social media accounts. Some of these have been identified their gender with male contributors were slightly more than the females. Almost a half of them were married. They were also

relatively young with more contributors being below 30 years old. Slightly more than half of the contributors had high school diplomas and the remaining half of them had higher education degrees, particularly some college diplomas. Table 1 describes the demographic data of some contributors to the topic of PE.

Table 1.

One typical way that the contributors engaged with the topics was through posting textual microblogs (e.g., posts, replies, tweets, retweets, status updates). The other ways included photo, video, and link sharing which made up 38,2% of the total post composition.

The big data analytics also extracted the post exposure (see Figure 2). More specifically, Twitter and Facebook had the tendency of more PE-related content being posted between March and April or the first months of the COVID-19 pandemic. PE had become an increasing topic again during the months of June and July when the academic year began for the first time with distance learning methods. However, the social media users of these two platforms seemed to lessen their engagement with PE content at the end of the semester. In the case of Instagram and YouTube, their post exposure tended to increase in the first months of the pandemic (April) and academic year (August). This was the time when PE learning might take advantage of the availability of visual and audiovisual contents to help with learning movement or skill development. During the months of November to December, the topics about PE became more exposed which might indicate the increased numbers of users engaging in posts related to the end of semester routines (e.g., final assignments, tests, assessments). It is also worth underlining that the National Teacher's Day observed on November the

25th might be the moment to engage with posts related to the appreciation of PE teachers.

Figure 2.

The contributors engaged with the issues through numbers of likes (1.226.204), comments and replies (29.403), and shares (59.520). We were also interested in looking at the specific social media users engaging in these posts. With the exception of YouTube (e.g., 18+ years old), the social media in this study restrict users only for those aged 13 and over. Facebook was populated by users aged between 18 to 30 years old. They might be, at least, high school graduates currently in college or in their early careers. If not single, they were possibly newly married users with relatively young children. Accounts with school-aged users (e.g., <18 years old) were less than 1%, indicating that Facebook exposure related to physical education during the early months of the pandemic and academic year did not involve significant numbers of students. In contrast, school-aged accounts were much higher on Twitter (28.8%) suggesting that some students might respond to the topics relatively the same way as the other Facebook users. The under-18 users were even more on Instagram (35.6%) illustrating that their engagement with the topics was likely to happen during the school days and increase at the end of the semester.

Furthermore, big data analytics have also been able to detect where and when the posts have been uploaded. Regarding the locations, for example, the users seemed to post the content from all over the country. However, more than half of that online traffic took place within provinces in Java, the most economically developed as well as populated island in the archipelago. Additionally, the tendency of these users to engage in the discourse being studied was during the weekdays. More specific times included

early in the morning from around 02:00 to 06:00 and some times during lunchtime. Every day in the evening (18:00 – 21:00), the social media users tended to not engage in topics related to PE. Figure 3 shows the tendency of audience time.

Figure 3.

Representing the school subject: physical education in the age of the global pandemic

Analysis of the users' posts resulted in the emergence of the second theme which is the representation of PE as a school subject. With respect to the health measures for COVID-19, distance learning had been implemented in major areas in the country. The representation of PE had considerably reflected this condition. The following paragraphs describe how PE had been represented in four social media platforms.

PE had been represented by the social media users through posting their opinion about the school subject, more 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, the majority of social media users considered that PE was actually 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 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 with predominantly showing agreement to that statement. In addition, the layman's perspectives about PE included the opinion that the school subject possessed qualities of being physical and athletic. 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 wasn't 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 highly visible soccer player in a local team whose picture became the cover of elementary an 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 contents such as sport skills (i.e., basketball, soccer, volleyball, badminton), exercise activities, and health (i.e., Coronavirus disease, immunity). Fundamental motor skills and gymnastics seemed to prevail as central 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 by themselves, others took advantage of the available contents relevant to their units.

With regard to 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 that 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 to teach 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 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 post on Facebook stating that, "Not ready or shocked by the condition that forces us to virtually teach PE. I used to neglect students' condition, backgrounds, and their 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 not only in online environments but also in 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 consisted 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, alright! 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 was unable to actually help her child studying at home.

Families, mothers in particular, also felt that they need to provide resources to support meaningful learning, especially for elementary-aged children. Some resources included time and efforts to teach their children despite lacking formal teaching skills. For example, a post on Facebook informed that a mother had a hard time understanding the curriculum, "Moms becoming a teacher at home have to understand the map of basic competences. You'll get a tummy ache, won't you moms? The most painful one is HPE." Another mother made excuses to her daughter, "Today, I became a PE teacher, I'm so sorry if mom couldn't 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 the second half of the year 2020 had been plagued by complaints. Parents might begin to realize that some schools did not deliver PE that helps students to actually learn the units and parent teaching had not been effective 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's impossible that I become a PE teacher. How's 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 (1) PE teachers' portrayal of having masculine traits; (2) social media user's negative sentiments; and (3) positive sentiments toward PE teachers. This representation seemed to be in contexts beyond the global pandemic.

The first sub-theme included the commonality of masculine depiction about PE teachers in social media. Analysis informed that male users tended to locate PE teachers as the role model 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 in favor of 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 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 years: 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 I'm 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'm a physed teacher."

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 piece of local news about this issue and commented, "Abusive is abusive, there is no reason for mutual love. He's an adult and he's supposed to know it's wrong to do it with 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 had affirmed the immensity of such negative portrayals about 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."

The last sub-theme described a more positive tone recounted PE teachers as casual, friendly, and favorite persons. 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 don't be noisy." Such 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. The context of this statement was the time when PE teachers were supervising written exams. There was no clue on the origin of this statement and the 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 had not been that scary after all. One commented, "God bless PE teachers! You're my hero." It was expressed because PE teachers assumed to indirectly help his/her with improving the test score average. The second trend included the timeframe around the National Teacher's Day on November, 25. Together with teachers of other subjects, PE teachers harvested appreciations 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's share your experience with PE teachers." This tweet got

87 engagements informing that PE teachers had been represented as generous and friendly teachers. Additionally, some other users also took advantage of the appreciation day to declare the acknowledgment of PE teachers' roles in facilitating their current accomplishments.

Discussion

Through big data analytics, the current study revealed representational topics within which PE teachers, PE learning, and students ranked the top three most discussed topics. It indicates the centrality of this triangle interaction (teacher-students-the event of learning) within the discourse of PE. In academia too, it has long been the focus of studies on PE, in particular the ones informed by behaviorist perspectives. Big data is also powerful in extracting information about the contributors of PE representation in social media. Interestingly, males and females have almost equally contributed to the representation although the literature has documented the dominance of masculinity in PE (e.g., Campbell, et al., 2018; Parker and Curtner-Smith, 2012; White and Hobson, 2017). It can be inferred that social media may potentially become an important outlet to express aspiration and voice for those who have so far been curbed in PE.

If representation communicates meaning (Hall, 1997), furthermore, what does it convey the meaning of PE though social media? Certainly, the social media users in this study did not explicitly state their meanings of PE nor we specifically looked for those meanings at the outset. But our efforts to thicken the data from big data analytics and then to further analyze those interpretatively have allowed us to look deeper into what possibly the meanings of PE. It is obvious that a high variety of meanings exist as a result of different PE experiences among social media users. However, analysis has enabled us to identify meaningful tones within their posts and engagements. These tones include the less intellectual nature of the subject matter and the emphasis on physicality.

Research findings informing these meaningful tones may not be a new addition to our understandings of the literature. Abundant works dedicated to examining these related issues (e.g., McEvilly, et al., 2015; Mikalsen and Lagestad, 2019) have crystalized conclusive knowledge on the meaning of PE. Specific studies on the representation of PE (e.g., Hyndman et al., 2020) also implicitly inform similar understandings. But the current study took an alternative pathway to contribute to the literature by considering data in which the information was not the social media users' responses to our questions. These users might genuinely express their thoughts, feelings, and attitudes toward PE so that trustworthy analytical processes can be promising in revealing more authentic meanings.

Social media users have also made known their thoughts and feelings as they were when posting about PE teachers. Like in other societies, teaching is generally a well-respected profession in Indonesia. However, we have learned from a critically-framed study by MCullick, et al. (2003) about seemingly negative depictions of PE teachers in movies. Taking into account Hall's (1997) theory, such cinematic representation can either be fictional or real. This was also true with this current study in which PE teachers were portrayed with strong negativity. Unlike the fictional depictions that are predominant in movies, the social media users' representation of PE teachers is more likely to refer to reality. More specifically, the negative sentiments were rooted in child abuse cases committed by PE teachers. It is noteworthy to put the local context of these proliferative sentiments. The laws concerning child protection from sex abuse have just recently been created in Indonesia and they have not systematically been enforced (Saputra and Soponyono, 2018). There is also a lack of systematic policy and programs to actually ensure the safety of children from sex offenders in educational institutions. As a result, this condition exposes schools to the

probability of getting individuals with history of child abuse into teacher labor markets. Negative sentiments uniquely taken place in Indonesia could be originated in this situation.

Like major aspects in education, COVID-19 has created serious disruptions in PE. Research within this area of literature is still emerging and far from being conclusive. However, a number of studies have begun to inform how PE has changed as a result of the implementation of distant learning. Varea and Gonzalez-Calvo (2020) showed that pre-service PE teachers experience a disruption in their teaching practicum as PE assemblage has changed from body constituted to less tactile approaches. Another study revealed that PE teacher education programs across Europe sought to resolve the tension between the experiential nature of PE and the blended approach to learning (O'Brien et al., 2020). The current study adds to such similar knowledge on which PE has disruptively been experienced by teachers, parents, and students. It showed how the experiential nature of PE had to be electronically mediated. Following Varea and Gonzalez-Calvo (2020), the pandemic left teachers with pedagogical anxiety as teaching became touchless and students' bodies were absent. However, social media users expressed that parents have extended teachers' roles to tactilely deliver PE.

Conclusion

Exploring the meaning of PE will be advanced from taking social media research into consideration. Borrowing the classic social constructionist framework (Berger and Luckmann, 1991), this study can be an important part of inquiries into the meaning of PE in which the members of a society conjointly construct what PE means to them and what assumes to be the reality of PE. Through social media platforms, people apparently co-constructed PE that was centralized around the topics about PE teachers, PE learning, and students. Further analysis also showed typical tones within the

representation of PE such as physicality and masculinity. The depiction of PE teachers included both negative and positive sentiments. These sentiments have been highly contextual in which the events in one society might play out in determining what and how topics about PE were discussed. The current pandemic has also become a global context served as a backdrop in which PE has locally been implementing. One way or another, activities and engagement in social media platforms reflected this condition.

Technically speaking, the overall presentation of the results has been enabled by big data analytics. Surely, we deal with such a large dataset at the outset. Analytical features within big data processes have enabled data extraction and presentation informing the central topics, users' profiles, their locations, and times of engaging with social media. We would not be able to work with such enormous data in traditional ways of data processing if we might not have utilized big data analytics. When this became the channel for a qualitative inquiry, it can promise alternative perspectives toward what we have understood all this time, or even new knowledge and understanding in educational literature.

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Table 1. Demographic data of some of the contributors.

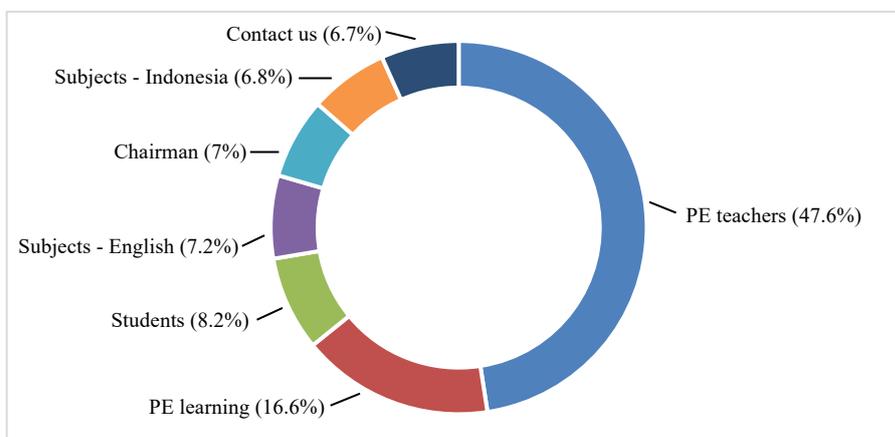|	*N*	**Percent**
Gender		
Male	5.496	57,9
Female	3.992	42,1
Marital Status		
Married	4.492	47.4
Not currently married	4.984	52.6
Age range		
< 18	2.887	30,2
18 - 21	785	8,2
22 - 30	3.369	35,2
31 - 40	1.701	17,8
41 - 55	562	5,9
> 55	257	2,7
Last education		
High school	4.287	52.3
College	3.493	42.6
Graduate school	411	5.1

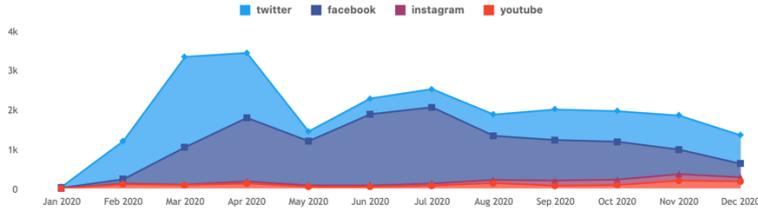Figure 1. Top representational topics regarding physical education in social media.

Figure 2. Post exposure of physical education topics in four major social media platforms (image retrieved from Intelligence Socio Analytics, reprinted with permission from Ebdesk).
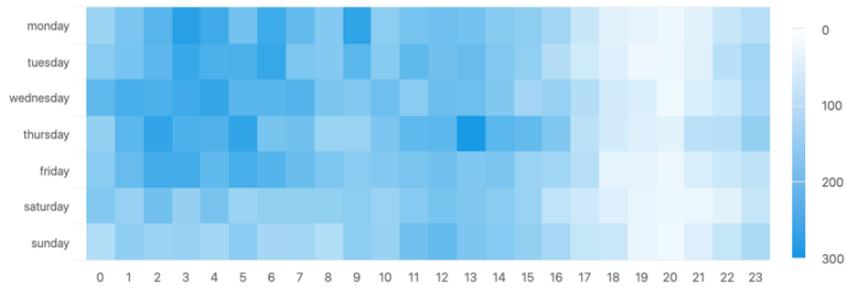

Figure 3. Tendency of the audience time (image retrieved from Intelligence Socio Analytics, reprinted with permission from Ebdesk)