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## A Transnational Research Collaboration: A Social Network Analysis and Perspectives on Our Community of Practice

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### ABSTRACT



Transnational research involves research in one country that benefits that country, and where the findings are compared to the extant studies in the larger field. It also involves the search for common effects and situational influences (i.e., country and culture-specific) toward a particular research topic. In this study we examine the transnational collaboration among 11 (5 female and 6 male) researchers located in five countries conducting research in seven countries for the past 18 years. Our purpose is to elucidate relationships among the team members. First, we use social network analysis to examine our publishing and presentation productivity. Second, we use a community of practice framework to understand our collaboration and scholarly relationships. Social network analysis showed that we are a strong decentralized social network with work shared across all members. Our community of practice analysis highlighted shared values, our shared impact, professional and personal rewards and challenges.

### KEYWORDS

Coauthorship networks; productivity; physical education research; collaboration

Collaborative research networks are increasingly a part of academia (Lund et al., 2016; Yang & Heo, 2014). Such arrangements allow for a variety of value-added strengths in support of research efforts, including the sharing of ideas, exploring issues of mutual interest, multiple and multi-disciplinary perspectives, resources, and increased productivity (Degn et al., 2018; Guo & Lei, 2020; Lund et al., 2016; Ng & Pemberton, 2013). We believe that research is enriched by collaboration among individuals with diverse and complementary perspectives.

Given the increased expectations in universities for global outreach, collaboration among researchers is also increasing (Degn et al., 2018; Ng & Pemberton, 2013). International collaboration refers to researchers in their own countries collaborating on common projects without leaving their home countries to collect data, conduct analyses, and the like (Lund et al., 2016). In contrast, transnational research involves researchers working in their own countries and in other countries designing studies, collecting and analyzing data, and

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engaging in various forms of collaboration such as conducting training, workshops, and consulting (Lund et al., 2016). Transnational research involves research in one country that benefits that country, and where the findings are compared to the extant studies in the larger field. It also involves the search for common effects and situational influences (i.e., country and culture-specific) toward a particular research topic (Lund et al., 2016).

Transnational research collaboration provides physical education researchers with opportunities to share experiences, data, and methods that can inform and provide the basis for new and important perspectives on existing practices in PK-12 physical education and physical education teacher education (PETE) in differing educational systems. We have been engaged in transnational collaboration for 18 years. Our team membership has been dynamic, with members of the original group leaving and new members joining across this time. Our collaborations are transnational because we work within and across countries, using multiple methodologies and involving multi-institutional teams in multiple sites. Specifically, our work has been conducted in Belgium, China, South Korea, Japan, Turkey, and the United States (U.S.). Each of these countries represents decidedly different PK-12 educational systems, PETE systems, and cultures.

In this article, we analyze our collaboration in two ways. First, social network analysis (SNA) is used to analyze our research relationships in terms of research articles and presentations. “A social network can be defined as a finite set of actors (or nodes) and the relationships (or links) between them” (Fonseca et al., 2016, p. 1). A research team in a collaborative research project is relational in terms of both prior and current research and publications. The primary focus of SNA is on the connections among researchers. SNA uses a set of statistical metrics to understand and quantitatively measure these relationships by determining the strength of each relationship. By quantifying the connections in a network, it is possible to identify the important investigators driving the research. Researchers have proposed or used SNA to (a) evaluate health education research networks (Fonseca et al., 2016); (b) assess medical center culture (Lurie et al., 2009); (c) support the evaluation of cross-disciplinary research programs (Yang & Heo, 2014); and (d) analyze collaborative research communities (Dunn et al., 2012). Our use of SNA represents the first time it has been used by physical education researchers to analyze quantitative indicators of a research network.

Second, we use Lave and Wenger (1991) community of practice framework to understand our collaboration and scholarly relationships. Lave and Wenger coined the term *community of practice* (CoP) to refer to groups of people who shared similar concerns, faced similar problems, or had a shared passion about a topic, and who as a community sought to strengthen their knowledge and expertise through regular social interactions. In our case, shared interests have centered around issues of pedagogical content knowledge, content knowledge, and their effects on student learning, and using these findings in preservice and continuing professional development. The countries we have studied faced similar educational problems despite their different educational, social, and cultural contexts. Within our CoP, research served as our practice. The CoP model describes how knowledge in a community is developed and shared. In particular, it explains how a group became familiar with and gained expertise through progressive involvement in interacting with other group members who varied in expertise (Wenger-Trayner & Wenger-Trayner, 2015). This process, called legitimate peripheral participation, provides both a conception and a practice of how new and existing group members acquire increasing competence in the group’s activities and move toward full legitimate participation. In

our case, competence is not just viewed in terms of doing research, but doing research in collaborative ways in different cultures and educational systems.

This article first presents and discusses quantitative indicators of our scientific work, including productivity and interconnectivity, using a new perspective on research networking, namely SNA. The second part of this article discusses our perspectives relative to this collaboration. We conclude with a summary and implications arising out of our findings. Our intent is to provide a discussion that will inform our peers and encourage more collaborative research in the field of physical education and PETE.

## Social network analysis

This section describes the cooperation among group members who form a network in terms of their publications and reviewed conference presentations. Networks are constructed by linking authors together who publish and present together. Though there are more members in our CoP than we report on in this study, only those members who had five or more articles or presentations with other team members have been included in our network analyses. As a matter of convention, we use numbers to identify participants.

## Participants

We are 11 researchers working in research universities with varied ranks: one lecturer, one senior lecturer, one assistant professor, five associate professors, and three full professors at the time of writing (see Table 1). Each participant was assigned an identification number, which will be used in the rest of this article. Most members joined the group as a graduate student or as a visiting scholar, with the exception of participants 11 and 9. Participant 11 started the CoP and participant # 9 was a colleague in the same institution who joined. As shown in Table 1 team members are located in the U.S. ( $n = 5$ ), Turkey ( $n = 3$ ), Belgium ( $n = 1$ ), China ( $n = 1$ ), and Israel ( $n = 1$ ). It should be noted that all of the U.S. team members are originally from other countries (two members are from Korea, one each from Australia, China, and Japan). Five of the researchers are women, and six are men.

**Table 1.** Demographic characteristics of CoP members.

Assigned #	Gender	Title/Rank	University/Location	Years Engaged
1	F	Senior Lecturer	David Yellin, College of Education, Jerusalem, Israel.	2004–18 years
2	M	Associate Professor	Marmara University, Istanbul, Turkey.	2014–7 years
3	M	Associate Professor	Karamanoglu Mehmetbey University, Karaman, Turkey.	2012–9 years
4	F	Lecturer	East China Normal University, Shanghai, China.	2015–6 years
5	M	Full Professor	Middle East Technical University, Ankara, Turkey.	2004–17 years
6	M	Associate Professor	KU Leuven, Leuven, Belgium.	2011–10 years
7	F	Associate Professor	Kent State University, Ohio, USA.	2007–14 years
8	F	Associate Professor	East Carolina University, North Carolina, USA.	2006–16 years
9	M	Full Professor	The Ohio State University, Ohio, USA.	2007–14 years
10	F	Assistant Professor	West Virginia University, West Virginia, USA.	2016–5 years
11	M	Full Professor	The Ohio State University, Ohio, USA.	2006–18 years

## Measures

In SNA, nodes are the primary units that are connected. In this case, the nodes represent the 11 researchers in the CoP. SNA statistics use the number of links (i.e., connections) among nodes as the basic unit to determine metrics. These links are represented on a network map. The links among nodes create lines called *edges* in a network map. Edges vary in thickness according to the relationship.

In this study, we used four metrics to analyze our publication and presentation relationships: density, centralization, degree centrality, and betweenness centrality. The *density* of a network is a measure of the number of links in a network divided by the number of potential links. It represents a measure of how connected the network is, compared to how connected it might be. Density is measured as a percentage with 100% being the highest density indicating the strongest connections among all network members. In a network, an individual's *centrality* (centralization) is a measure of the extent that network links are focused on one or a few nodes (i.e., researchers). Centralization scores range from 0 to 1. Scores closer to 1 define a more centralized network, while those closer to 0 define a more decentralized network. Individual centralities provide insight into the location and grouping of researchers in the network. Such as who is in the core of the network and who is on the periphery. The *degree centrality* of a node is defined as its number of connections. It indicates how much of a node (i.e., researcher) communicates directly with other nodes. In its simplest form, a node with ten links would have a degree centrality of 10. *Betweenness centrality* is a measure of the extent to which a researcher occupies a strategic position in the network in terms of the geodesic paths connecting researchers. Specifically, it is the number of times a node lies on the shortest path between other nodes. For example, a researcher may work with others in their country, and they do research with each other as well as members of the group. Without this researcher, connections to the researchers in the country would not occur. In this sense, the connections are “between” two groups, and without them, no link would exist. It highlights their role in the network for facilitating productivity. In short, their location matters on a network map.

## Data collection and analysis

Data were collected from the CoP, which defines the scope of the network (i.e., 11 researchers). Participants provided verbal informed consent as required by the institutional review board of the first author's institution. Participants used their curriculum vitae to identify on a matrix their publication and presentation collaborations with other members in the network. The data included only in press, published articles, or peer reviewed presentations. The data analyzed by the Social Network Visualizer (Kalamaras, 2014; SocNetV version 1.4) which is an online software program that creates network maps and reported the descriptive statistics for the network.

## Results

The Network maps for publications and presentations are displayed in [Figure 1](#) (publications) and [Figure 2](#) (presentations). Links in each figure show the relationships among group members. The thickness and thinness of links indicate the strength of the network

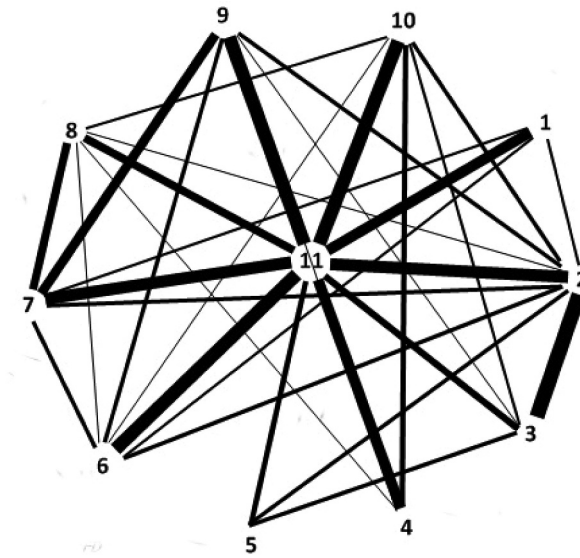


Figure 1. Network map of group members for publication.

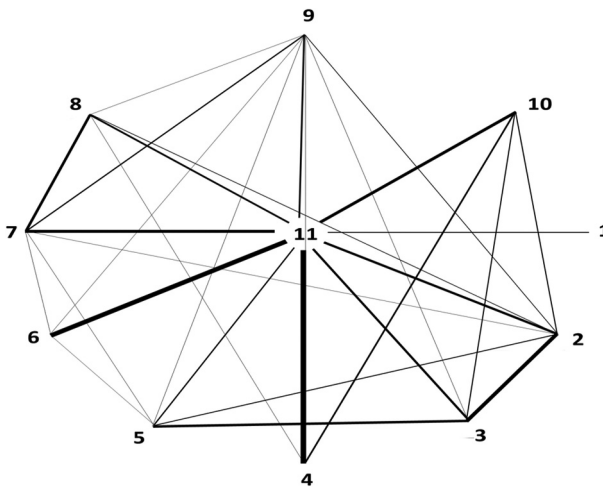


Figure 2. Network map of group members for presentation.

connection. The thicker ties demonstrate a higher connection, and the thinner ties show a lower connection (i.e., the numbers of total publications and presentations).

### Density

Network maps for publications and presentations results clearly showed that the numbers of links in both maps were high. Density scores for publications and presentations networks were 0.62 (i.e., 62%) and 0.55 (i.e., 55%) respectively. This demonstrates a moderate to strong

relationship among group members in each network (Freeman, 1979; Hanneman & Riddle, 2011).

### Centralization

In this study, publications and presentations of centralization mean scores were 0.09. This score indicates a decentralized group network showing that collaboration has been occurred among different research members, not only with one a or few research members (see Tables 2 and Tables 3).

### Degree centrality

This analysis was used to identify the leaders of the network. People who are highest in degree centrality are important, supportive, and influential to the network. The data for publications indicate that participants 11, 2, and 7 are the most contacted and supportive individuals for the group network. For presentations, the order is participants 11, 3, and 2 (see Tables 2 and Tables 3).

**Table 2.** Group members’ publication network table.

Network-Level Metrics	<i>M</i>
Density	0.62
Average number of links per person	3.09
Degree centralization	0.09
Average distance	0.24
Node-Level Metrics	
Highest in degree	Participant 11 (79) Participant 2 (38) Participant 7 (30)
Greatest number of links	Participant 11 (10) Participant 2 (9) Participant 9 (7)
Highest betweenness	Participant 11 (58) Participant 2 (16) Participant 7 (14)

**Table 3.** Group members’ presentation network table.

Network-Level Metrics	<i>M</i>
Density	0.55
Average number of links per person	2.73
Degree centralization	0.09
Average distance	0.26
Node-Level Metrics	
Highest in degree	Participant 11 (88) Participant 3 (32) Participant 2 (31)
Greatest number of links	Participant 11 (10) Participant 9 (8) Participant 2 (7)
Highest betweenness	Participant 11 (55) Participant 2 (12) Participant 7 (10)

## **Betweenness**

This metric is relevant to how often a person has connections with other members of the network. People who are highest in their betweenness scores have strategic positions and act as bridges in the network. In this study, 11 has the highest betweenness scores at both publication and presentation networks, followed by 2 and 7 (see [Tables 2](#) and [Tables 3](#)).

## **Social network analysis discussion**

The network maps showed that the numbers of links among researchers were strong for both publications and presentations. In short, there were many links among the members of the networks in terms of lead authors and coauthors. These map findings were supported by density scores, indicating a strong relationship among group members in terms of publications and presentations. The high density of the network is likely one reason why the network has longevity for 18 years. Explanations for the density also include frequent research projects, regular meetings, and the similarity of their research interests.

This social network was shown to be decentralized. Results showed that though group members had supportive relationships (i.e., density), their networks were not dependent on only a few individuals. If one or two individuals were to leave the network, the group could continue its connection because there were robust relationships among different research members (Freeman, 1979; Hanneman & Riddle, 2011). This is an important indicator of the success of the group. As indicated by the betweenness scores, participant 11 was a central and influential stakeholder in the network. This participant 11 had high scores because he has acted as a bridge among group members. However, because this is a decentralized network, were these to leave, the network would likely continue (Freeman, 1979). One reason for this is that 2 and 7 also had high betweenness scores. This is also a possible reason why the network has endured for 18 years. A decentralized social network ensures that the development, progression, and productivity of a group will continue. In simple terms, because everyone is carrying their share of the weight. Moreover, it should be expected that given the decentralized nature of the network and the measures of individual centrality, the number of links to one another will increase in the future (Hanneman & Riddle, 2011).

## **Participant perspectives on our collaboration in our research community of practice**

The SNA provides quantitative indicators as to the strength of the network, which in turn provides insight into the longevity and survivability of the network. In this section, we discuss the context of our CoP and discuss themes that emerged from group members responses in an open-ended survey.

## **The CoP context**

The principal tasks of the CoP are conducting research studies, writing research articles, presenting research, and attending conferences. These tasks are all in service to teaching effectiveness and, in particular, our understanding of pedagogical content knowledge, content knowledge, and student learning. The initial locus was work begun at The Ohio State University in the early years of the 21<sup>st</sup> century. The CoP was initiated by participant



11 with the goal of creating a more distributed workload for research focused on teaching. Team members were introduced to the idea of collaborative research as graduate students, visiting scholars, or as colleagues. The addition of new members continued to grow under the umbrella of the *Learning to Teach Physical Education Research Program* (<https://u.osu.edu/ltppe/>). (Masked for anonymity).

The CoP became a more global effort as members developed their research agendas in their home countries in collaboration with team members in other countries over time. Replicative studies began to demonstrate the similarities and differences in different settings and studies in different countries were informed by our increased understanding of these similarities and differences.

Research meetings represent the core of our shared history of collaboration. Meetings included discussions of research procedures, variables, research design, discussion of theoretical conceptions and finding of existing research, and the writing of articles and presentations. The meetings occurred in person on campus, but also at international and national conferences. However, as the geographical locations of members increased, the meetings quickly grew to occur in virtual settings (e.g., virtual conferencing). These virtual communities were supplemented by e-mail and document storage (e.g., Box). These meetings were viewed by members not just as a scientific activity but also as professional development.

### ***Data collection and analysis***

To further our understanding of our perspectives, we collaboratively developed a set of open-ended questions (e.g., What are the benefits for you of this collaboration? What are the challenges? and What do you see as our shared values?). The survey questions were edited and refined by all team members using several rounds of edits. Once this survey was finalized, the questions were sent to all team members, who were asked to provide open-ended answers to 12 questions. The first author identified common themes from the answers using by inductive analyses. Four themes emerged from the analysis. The themes were then sent to all team members for confirmation, editing and refinement. This served as a form of member checking which developed trustworthiness in the findings (Creswell, 1994). There were two complete cycles of member checking supplemented with a number of individual and group e-mails, and some phone calls to clarify particular perspectives. We also actively looked for any negative cases.

### **Themes and discussion**

Four themes emerged from the data analyses of the survey responses: (a) Our similar values, (b) our impact, (c) the extent to which we have found the CoP professionally and (d) personally rewarding and challenges to our transnational collaboration.

### ***Similar values***

Central to Lave and Wenger (1991) notion of a CoP is a common purpose underscored by shared values. The members reported seven recurring key values. First is a commitment and focus on improving the quality of teacher education at both the preservice and continuing

levels to improve the education of children and adolescents in physical education. Second, there is a global view of research emphasizing the commonality among our findings and examining the reasons for differences in terms of culture and educational systems. Third, there are shared philosophical positions on teaching and learning. While members are driven by different epistemologies (e.g., behavior analysis, social constructivism, or social cognitive theory), there is a common ground, and that is teacher development and student learning. Fourth, mutual respect among researchers. We see this existing across gender, ethnicities, cultures, different educational systems, academic ranks, and institutional types. All of these values have been reported as common values in other transnational studies (e.g., Degn et al., 2018; Guo & Lei., 2020; Ng & Pemberton, 2013), and many of these values have been reported in collaborative efforts in our field (e.g., Patton & Parker, 2017; Ward et al., 2021). Fifth, in addition to these values, members in this study also valued a willingness to help one another in developing and conducting research. Sixth, a shared passion for the subject matter we study was one of the common values. These have been common values reported in CoP (Lund et al., 2016; Patton & Parker, 2017). Finally, at the heart of our shared values is a belief, best represented by one of our members.

I value the collaborative work with diverse populations who have different backgrounds, cultures, and perspectives. It is meaningful and important to view and understand the educational environments and phenomena with diverse perspectives, which allows us to deconstruct our biases or develop more critical eyes and thoughtful minds as researchers and educators (Participant 7).

As new members have been enculturated to the group over the years, these are the values they have seen in our work. The values have been reinforced in our discussions, research presentations, research articles, and in our practices. As new members take in increasingly more tasks in the group (i.e., legitimate peripheral participation), their values and behaviors have been shaped through that participation.

## **Impact**

Collectively our studies have examined knowledge and behaviors in more than 16,000 pre-service and in-service teachers in Belgium, China, Korea, Japan, Turkey, and the U.S., demonstrating cross-cultural similarities, despite different educational systems (Ward et al., 2020). In addition, our control group intervention studies have examined 98 teachers and their students. These studies have reported that improved content knowledge allows teachers to better adapt their instruction to the needs of students and increase student learning (Ward et al., 2020). These results have led to policy and practice changes in a number of countries.

In Belgium, in addition to research in physical education content, research has been conducted on Basic Life Support teaching, and the knowledge and performance of lifeguards has received wide attention in the media. Studies on this topic have been published in *Resuscitation*, the #1 journal in the world for emergency medicine (e.g., Iserby et al., 2017).

In China, more than 20,000 teachers have participated in or viewed online workshops conducted by group members (X. Wang, personnel communication, April 28, 2018; Dean of College of Physical Education and Health, East China Normal University, Summary letter). Our research has influenced the design of the Chinese national teacher training standards (General Office of the Ministry of Education China, n.d.); and the development of

physical education curricula (Wang & Niu, 2018). In addition, there have been a number of undergraduate physical education teacher education curriculum reforms in universities (Participant 9).

In Turkey, our work has been a part of two large-scale national research projects. One, government-funded, focused on designing and implementing teacher professional learning communities (Ince et al., 2020). A second project focused on determining content knowledge in teacher education programs in Turkey (Derwent et al., 2020). In the U.S., the research we have completed has influenced the content of the SHAPE America standards for beginning teachers (Society of Health and Physical Education of America, 2017), created protocols for data collection (Derwent et al., 2016), led to translated research in practitioner-oriented articles (e.g., Tsuda et al., 2018) and a book for teachers and teacher educators (Ward & Lehwald, 2018). In addition, content knowledge measurement instruments have been validated in China (He et al., 2018), Korea (e.g., Lee et al., 2018), Japan (e.g., Tsuda et al., 2019), Turkey (e.g., Devrilmez et al., 2019) and the U.S. (Tsuda et al., 2021). There have also been research communities created in support of our efforts in Belgium, Korea, Turkey, and the U.S.

Communities of practice are well known for impacting the practice of participants (Patton & Parker, 2017; Wenger-Trayner & Wenger-Trayner, 2015). Many of the comments from team members also reflected on how our research had changed their and their peers' teaching practices in their institutions. For example, a Belgium colleague noted, "Our research collaborations have drastically influenced my teaching and the curriculum I use in PETE" (Participant 6). Another team member from Turkey commented, "Two colleagues in my university who teach volleyball, basketball, and gymnastics, changed their teaching from common content knowledge focused instruction to specialized content knowledge focused instruction" (Participant 3). In Japan, people started to get to know the notion of content knowledge and to recognize the importance of teachers' knowledge (Participant 10).

### ***Professionally and personally rewarding***

The benefits to team members can be considered from two broad but distinct perspectives: professionally and personally. From a professional perspective, members reported how being involved in this transnational collaboration, including our discussions, visiting universities, and conducting, publishing, and presenting research, has led to their advancement in academia. Representative comments included: "I am the first person in China to engage in content knowledge research for physical education teachers in this way. My doctoral dissertation was completed in the process of participating in this project" (Participant 4). "Being in this research team is the most meaningful and impactful professional development to me" (3). "My academic career continues to flourish, in part, due to my participation in this group" (Participant 1). "Working with a talented team has been scientifically rewarding to me in terms of evaluating refined conceptions of teaching effectiveness and teacher education" (Participant 11). "I have always considered this collaboration as a professional development for my teaching and being a teacher educator" (Participant 9). Several team members echoed this comment from a Turkish scholar:

I have a better idea about the physical education practices globally. I have a global connection with the experts focusing on similar topics. Group members follow the studies and increase the

visibility of them by citing in their publications. Having a global collaboration makes it easier to collect data from different cultures and examine the problems faster (Participant 5).

Status and rank were also impacted. In Israel, one team member noted, “Involvement with the team contributed to my being promoted to senior lecturer” (Participant 1). For researchers in Turkey, three team members commented similarly, “This collaboration helped me secure an academic job at a research university in Turkey” (Participant 5). Thanks to the studies I have been a part of, I was invited to a couple of projects that held by the Ministry of Education’ (Participant 3) and,

After I came back from Ohio State, the way senior colleagues and administrators approached me in terms of scientific expertise got better. People have started to ask my opinions more often. I feel more respected in the PETE area in Turkey (Participant 2).

There was also an acknowledgment that this collaboration resulted in graduate students interested in the topics investigated by the group being attracted to team members.

A second perspective shared by many team members was that our collaborations were personally rewarding which is best summed up as enjoyment and friendships. There is a strong connection and friendship among the group members. For example, “A strength of our collaboration is enjoyment. I love studying with this group. I believe all members feel like me. It makes us more productive. We have a great friendship beyond scientific research” (Participant 3). This has been recognized as a key motivator in these types of collaborations. In their investigation of transnational collaboration, Lund et al. (2016, p. 18) note, “we argue that there may be other forces at work in cross-cultural work relationships, such as friendship, mutual support, and trust, which may be decisive factors for how research collaborations may be conducted in less hierarchical ways.” This has also been a commonly reported outcome in studies of CoP (Patton & Parker, 2017). We have found, as Lund et al. (2016) did, that research strengthened and reinforced our friendship and that our friendship strengthened our research. Our friendship often allowed a more critical examination of our work, contestations that were not perceived as undermining our work, and negotiations that led to consensus in how we proceeded in our research. This was critical not just because of varied epistemological backgrounds but also our culture and global geographical locations and identity in the CoP. Most importantly, for many of us, English is not our first language. Friendship has strengthened our individual identities and the identity of the group. The role of friendship in research collaborations has been seldom studied and our collaborations indicate that it allowed us to be better collaborators and developed personal friendships that have sustained over time.

### ***Challenges to transnational collaboration***

There were a number of challenges to transnational research collaboration that we have encountered. The most significant is language. Our common language is English. However, all but one of the team members speak at least two languages, and for ten members of the team, English is their second language. It is important to recognize that the 11 CoP members are leaders of projects in their home countries where their personnel they lead might not speak English. They must also recruit and train data collectors, find translators for workshops and lectures, learning new statistic software, write and edit in English, reply to review comments, make presentations in English, and such like.

This creates translation challenges. The most common we have found is that concepts and wording found in English do not transfer well to other languages. For example, the terms common and specialized content knowledge have proven especially difficult in translation verbally and in research protocol documents. In addition, depending on the English competence of a team member, their initial understanding of theory and concepts may progress more slowly than English speakers. The translation is also very time consuming, as one of our Korean researchers noted:

When conducting projects in Korea, so much extra work was required. For example, all materials related to training and data collection had to be translated into Korean. Instructional videos for completing the content map were translated into Korean. All written documents such as consent forms, a written form of instructions for completing tests, and test forms were translated into Korean (Participant 8).

In addition, issues of translatability and validity need to be addressed when the original documents are in English, and they are being translated to another language or vice versa. This also includes establishing face and content validity for knowledge tests in a particular country.

There is also the challenge of coordinating meeting times virtually across many time zones on different days. It requires team members to have flexibility with some meetings at 7am and others at 10pm. As one member put it, “Let’s remember the last week’s meeting. The time difference was 14 hours. Everyone is so understanding and flexible and they do their best to meet on a common time” (Participant 2).

Among the larger logistical challenges is the task of following institutional review board (IRB) proceedings. We have taken the position that if U.S. researchers were involved in studies in other countries, then at a minimum, the standards expected from the U.S. are used. Typically, we ask for an IRB review at each institution we work with or for their permission to use a common procedure approved by the lead university’s institutional review board, often subsumed under whoever is the project leader for that study. For most countries, this did not present problems. However, our work in China initially faced challenges because there was no established IRB or procedures for conducting research at the university we are working with. Over time that changed, and beginning in 2015, their systems became more aligned with other nations. In Belgium, our research team is housed under a biomedical IRB and can sometimes ask for more demanding requirements for informed consent.

Many institutions in the U.S. require that project leaders and data collectors are trained in research, ethics, and compliance using the National Collaborative Institutional Training Initiative (CITI). One of our researchers conducting studies in Japan noted, “One challenge I had in Japan was to ask Japanese scholars to complete the CITI training. There is no Japanese version, and with their English language skills, the training was very difficult to complete” (Participant 10).

Finally, we want to recognize that our collaborations have typically been viewed favorably by institutions and most colleagues. Some of us, at times, have been challenged in our home countries for engaging in this type of collaboration. It is difficult to determine if the problems were with us as younger scholars having engagement beyond our borders or if our explanations of what we were doing were unclear. For example,

In presenting at a scientific congress organized in my home country in 2016, when experienced researchers saw our study, they looked down on it and said, ‘We have done this almost 50 years. This is not new’. They did not accept our theoretical framework. Later, when we published that

study, they responded, “Sorry, we did not understand why the content knowledge framework was important” (Participant 3).










### **Summary and implications**

This study makes two distinct contributions to the physical education literature. First, it is the first study in our field to conduct a social network analysis of faculty productivity and engagement centered around a single CoP. In addition to presenting a novel methodology to examine collaborative relationships among faculty, it highlights that collaboration begets collaboration as a key finding in the smaller projects among team members arising from their participation in the larger CoP. Unreported are the very many, small within and sometimes transnational collaborations that have occurred but which do not meet our inclusion criteria for this study.

Second, this study is the first to examine transnational research collaboration in our field. We have reported on the value, impact, professional and personal benefits, and the challenges of engaging in transnational research. While many of our findings might be predicted from other research collaboration studies and CoP studies, we want to highlight two important outcomes in this conclusion: (a) long term success and (b) the role of friendship in our research activity. By measures of policy and practice impact, our collaborations have been important. In terms of faculty productivity, our team members have benefited from our collaborations, which has led to jobs in research institutions’ promotions and recognitions. The CoP has been in place now for 18 years, so its longevity in terms of productivity and impact has been both sustained over time, which is an uncommon outcome of many collaborations.

We reported in this article our view and the view of other researchers (e.g., Lund et al., 2016) that friendships strengthened our individual identities and productivity and the identity and productivity of the CoP. We noted that because we were friends, this often allowed for a more critical examination of the work by one another, contestations that were not perceived as attacks and that we often were able to achieve consensus in how to proceed in our research. This is an understudied area of research collaboration. As we noted earlier, the importance of friendship is often reported in the CoP literature (Patton & Parker, 2017). Friendship as a factor for how research collaborations work is worthy of further study. So too are studies that examine other factors leading to successful collaborations both locally, internationally, and transnationally. Our intent in the article has been to provide a discussion that will inform our peers and encourage more collaborative research in our field and more investigation.

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## References

- Creswell, J. (1994). *Research design: Qualitative, quantitative and mixed method approaches* (2nd ed.). Sage.
- Degn, L., Franssen, T. P., Sørensen, M. P., & Rijcke, S. D. (2018). Research groups as communities of practice – A case study of four high-performing research groups. *Higher Education*, 76(2), 231–246. <https://doi.org/10.1007/s10734-017-0205-2>
- Dervent, F., Tsuda, E., Devrilmez, E., & Ward, P. (2016). *Content development coding assessment manual*. Version 2.0. <https://u.osu.edu/ltpe/>.
- Dervent, F., Ward, P., Devrilmez, E., & Ince, M. L. (2020). A national analysis of the content knowledge of Turkish physical education teacher education students. *Physical Education and Sport Pedagogy*, 25(6), 613–628. <https://doi.org/10.1080/17408989.2020.1779682>
- Devrilmez, E., Dervent, F., Ince, L., & Ward, P. (2019). A test of common content knowledge for gymnastics. *European Review of Physical Education*, 25(2), 512–523. <https://doi.org/10.1177/1356336X17751232>
- Dunn, A. G., Gallego, B., & Coiera, E. (2012). Industry influenced evidence production in collaborative research communities: A network analysis. *Journal of Clinical Epidemiology*, 65(5), 535–543. <https://doi.org/10.1016/j.jclinepi.2011.10.010>
- Fonseca, B. D., Sampaio, R. B., Fonseca, M. V. D., & Zicker, F. (2016). Co-authorship network analysis in health research: Method and potential use. *Health Research Policy and Systems*, 14(34), 1–10. <https://doi.org/10.1186/s12961-016-0104-5>
- Freeman, L. (1979). Centrality in social networks conceptual clarification. *Social Networks*, 1(3), 215–239. [https://doi.org/10.1016/0378-8733\(78\)90021-7](https://doi.org/10.1016/0378-8733(78)90021-7)
- General Office of the Ministry of Education China. (Draft, n.d.). *Guiding standards of training curriculum for physical education teachers in compulsory education*.
- Guo, S., & Lei, L. (2020). Toward transnational communities of practice: An inquiry into the experiences of transnational academic mobility. *Adult Education Quarterly*, 70(1), 26–43. <https://doi.org/10.1177/0741713619867636>
- Hanneman, R. A., & Riddle, M. (2011). Concepts and measures for basic network analysis. In S. J. Scott & P. J. Carrington (Eds.), *The SAGE handbook of social network analysis* (pp. 340–369). SAGE Publications.
- He, Y., Ward, P., & Wang, X. (2018). Validation of a common content knowledge test for soccer. *Journal of Teaching in Physical Education*, 37(4), 407–412. <https://doi.org/10.1123/jtpe.2017-0204>
- Ince, M. L., Hünük, D., Öztürk, M. A., Savucu, Y., Yanık, M., Yıldırım, İ. S., Çapa Aydın, Y., Tannehill, D., & Ward, P. (2020). *Beden eğitimi öğretmenleri için kanıta ve Üniversite-MEB işbirliğine dayalı bir hizmet içi eğitim uygulamasının yaygınlaştırılması* [Dissemination of evidence-based in-service training approach for the physical education teachers through University - Ministry of Education collaboration] (Tübitak Project Report, Grant No:215K460).
- Iserbyt, P., Theys, L., Ward, P., & Charlier, N. (2017). The effect of a specialized content knowledge workshop on teaching and learning Basic Life Support in elementary school: A cluster randomized controlled trial. *Resuscitation*, 112, 17–21. <https://doi.org/10.1016/j.resuscitation.2016.11.023>
- Kalamaras, D. (2014). *Social Networks Visualizer (SocNetV): Social network analysis and visualization software*. *Social Networks Visualizer*. Retrieved June 11, 2021, from <http://socnetv.sourceforge.net>
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.
- Lee, H., Ko, B., Ward, P., Lee, T., Higginson, K., He, Y., & Lee, Y. (2018). Development and validation of common content knowledge test for soccer. *Korean Journal of Sports Science*, 4(4), 650–659. <https://doi.org/10.24985/kjss.2018.29.4.650>
- Lund, R., Kusakabe, K., Panda, S. M., & Wang, Y. (2016). Building knowledge across transnational boundaries: Collaboration and friendship in research. *Emotion, Space and Society*, 20, 18–24. <https://doi.org/10.1016/j.emospa.2016.05.002>

- Lurie, S. J., Fogg, T. T., & Dozier, A. M. (2009). Social network analysis as a method of assessing institutional culture: Three case studies. *Academic Medicine: Journal of the Association of American Medical Colleges*, 84(8), 1029–1035. <https://doi.org/10.1097/ACM.0b013e3181ad16d3>
- Ng, L. L., & Pemberton, J. (2013). Research-based communities of practice in UK higher education. *Studies in Higher Education*, 38(10), 1522–1539. <https://doi.org/10.1080/03075079.2011.642348>
- Patton, K., & Parker, M. (2017). Teacher education communities of practice: More than a culture of collaboration. *Teaching and Teacher Education*, 67(1), 351–360. <https://doi.org/10.1016/j.tate.2017.06.013>
- Society of Health and Physical Education of America. (2017). *2017 National Standards for Initial Physical Education Teacher Education*. Retrieved June 11, 2021, from <https://www.shapeamerica.org/accreditation/upload/2017-SHAPE-America-Initial-PETE-Standards-and-Components.pdf>
- Tsuda, E., Ward, P., & Goodway, J. (2018). Defining tennis content in upper elementary physical education. *Journal of Physical Education, Recreation and Dance*, 89(6), 33–41. <https://doi.org/10.1080/07303084.2018.1476939>
- Tsuda, E., Ward, P., Kim, J., He, Y., Sazama, D., & Brian, A. (2021). The tennis common content knowledge measure validation. *European Physical Education Review*, 27(3), 654–665. <https://doi.org/10.1177/1356336X20982629>
- Tsuda, E., Ward, P., Yoshino, S., Ogiwara, T., He, Y., & Ohnishi, Y. (2019). Validity and reliability of a volleyball common content knowledge test for Japanese physical education preservice teachers. *International Journal of Sport and Health Science*, 17, 178–185. <https://doi.org/10.5432/ijshs.201916>
- Wang, X., & Niu, X. (2018). *Physical Education and Health Curriculum: KDL (Level 1)*. East China Normal University Publishing House.
- Ward, P., Ayvazo, S., Dervent, F., Iserbyt, P., & Kim, I. (2020). Instructional progression and the role of working models in physical education. *Quest*, 72(4), 410–429. <https://doi.org/10.1080/00336297.2020.1766521>
- Ward, P., Lawson, H., van der Mars, H., & Mitchell, M. (2021). Chapter 1: 21st Century Physical Education in the United States: Introduction to the Special Issue. *Journal of Teaching in Physical Education*, 40(3), 345–352. <https://doi.org/10.1123/jtpe.2020-0239>
- Ward, P., & Lehwald, H. (2018). *Effective physical education content and instruction*. Human Kinetics.
- Wenger-Trayner, E., & Wenger-Trayner, B. (2015). *Introductions to communities of practice*. <https://wenger-trayner.com/introduction-to-communities-of-practice/>
- Yang, C. H., & Heo, J. (2014). Network analysis to evaluate cross-disciplinary research collaborations: The Human Sensing Research Center, Korea. *Scientific Public Policy*, 41(6), 734–749. <https://doi.org/10.1093/scipol/scu007>