

A TPACK-based Personality Education Program for Korean PE Class

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This study aims to develop *The Reform of the Physical Humanistic Education School (TROTPHES)* model, which is a *Technological Pedagogical content Knowledge (TPACK)*-based character education program in Physical Education. To develop *TROTPHES*, a panel of experts was formed and conducted in-depth interviews and Delphi survey. Throughout the interviews and Delphi survey, primary characters and physical education lesson topics were identified. Preliminary *TROTPHES* model were introduced to 51 PE teachers who were selected by 17 cities and providences and local education offices across the country. Finally, two-leveled *TROTPHES* including four primary characters (sense of community, positive attitude, self-sacrifice, and confidence) were developed. Level 1 focuses teachers' practice of classroom management, while Level 2 deals with teacher-student and student-student interactions based on instructional content. *TROTPHES* encompasses the content requiring intentional efforts from the basic character education in PE and is designed to be applicable to instructional plans in the form of a TPACK-based character education for PE.

Key word: Physical education, Character education, Humanity education

Introduction

The schools to date have faced various issues, including bullying, student drop out, behavior problems, etc. (Banks, 1997; Bowers, Scrott, & Taff, 2012; Morgan, 2012; Rigby, 2012). Developing the humanistic character based education program is the first step to reform school education program and resolves the issues stated above. In the past, physical education professionals expressed the

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importance of addressing affective domain and character development in PE (Solomon, 1997; Stolk, Los, & Veugelers, 2012). Moreover, several researchers have implemented the character based education concept in PE and reported the benefits of the program (Destani, Hannon, Podlog, & Brusseau, 2014; Kim, 2011; Sullivan, 2006; Yoo, 2012). Sullivan (2006) introduced ideas on how to utilize the character education concept into physical education classes. She provided specific examples for using teachable moment to foster the good character affective domain in PE. Destani and his colleagues (2014) also have been using character based education in PE. They applied the five-level personal and social responsibility model in a wrestling unit to prompting character development. According to authors, students can develop both moral and physical charter throughout this new proposed model. Likewise, Kim (2011) developed a creativity-character model for PE classes for youth. Yoo (2012) also proposed a PE lesson model for creativity-character education for students' core competencies. Despite the proliferation of materials developed in the form of lesson plans for character education in PE, previous studies also note that the effectiveness of character improvement programs in PE varies depending on individual teacher's subjective idea or the school policy (Kim, 2011; Sullivan, 2006; Yoo, 2012). Often, such programs fail due to the difficulties of their application and generalizability in the field.

Since digital natives are in school, technology has become an essential part of education. Moreover, The National Association for Sport and Physical Education (NASPE) has published the position statement on appropriate use of instructional technology as supplementing instruction in physical education (National Association for Sport and Physical Education, 2009).

When Mishra and Koehler (2006) classified the teachers' knowledge to effectively teach the Technological Pedagogical Content Knowledge (TPACK), researchers have applied the TPACK framework to science education, online distance learning, and computer education (Abbitt 2011; Archambault & Crippen 2009; Chai, Koh, & Tsai 2010; Voogt, Fisser, Pareja Roblin, Tondeur, & van Braak, 2013). However, TPACK has not been widely implemented in the field of physical education. Recently, Cengiz (2014) conducted study on how pre-service physical education teachers TPACK, technology integrated self-efficacy, and instructional technology outcome expectations have changed over 12 weeks intervention. The author stated that effect of 12 weeks intervention on pre-service physical educators' TPACK and instructional technology outcome expectations. Cengiz (2014) also stated that his study was examined within the Turkis physical education context and suggested further studies are necessary.

In 2013, the Korean Ministry of Education publicly announced plans for vitalizing the Physical Education (PE) programs in school by developing the "humanistic characters" of K-12 students in South Korea. The basis for the new plan aroused from previous literature reviews as well as field

observations, that interactions during physical activities in PE provide natural opportunities for community characters to evolve, such as communication skills and collective affinity (Flook, Repetti, & Ullman, 2005; Francois & Shephard 2010). Therefore, the need for developing *The Reform of the Physical Humanistic Education School (TROPHPES)* model, which is a TPACK based character education program in Physical Education.

Methods

Development of TROPHPES

Applying *Technological Pedagogical Content Knowledge (TPACK)* model, the authors initially developed “*The Reform of the Physical Humanistic Education School (TROPHPES)*” model in 2013.

Participants and development process

After developing preliminary *TROPHPES*, the authors sought out for feedbacks from the PE professionals. The participants were 152 professionals (123 males and 29 females) including, 141 PE teachers (92.8%), 13 university PE professors (8.6%), and 4 administrators (principals and vice principals who majored in PE) (2.6%). In-depth interviews were conducted for those who have 5 or more years of PE teaching experiences. Also, two rounds of the Delphi survey technique was conducted order to derive valid and reliable materials mirroring the specific condition of character education in PE. It is recommended that forming 20 panelists (18 males, 2 females; with an average of 8 years’ teaching experience) for the Delphi survey technique (Choi, 2012; Hsu & Sandford, 2007; Okoli & Pawlowski, 2004). After the Delphi process, two user committee meetings were held, with 16 and 10 secondary PE teachers with 7 or more years of experience, respectively. In these meetings, PE teachers met with 5 university professors who are expert in the field of sports pedagogy, sports sociology, and sports psychology, and 1 PE administrator discussed applicability of *TROPHPES*. Finally review meeting was held with, 2 secondary school principals and a vice principal, 2 PE teachers, and 2 foreign professors met to review the materials that were developed. A total of 102 (6 from each of 17 municipal offices of education nationwide) primary and secondary PE teachers participated in the validation process.

Analysis and validation process

The entire project guaranteed participants anonymity. The focus of analysis was given to revamp the current PE program reflecting remaining problems of previous character education from the field

experts. The information derived as such was triangulated with member checks conducted by an expert group (professors of sports pedagogy and sports sociology), which increased the authenticity and reliability of the data analysis (Patton, 2002). Interviews were recorded on a recording device and the prior informed consent was received from the participants (Wolcott, 1992). Recordings were transcribed for later analysis. The important points were noted down on the spot during the interview. All procedure ensured confidentiality of the participants. Expert validation was conducted to refine the materials for researchers and to complement the structure and theoretical rationales for character factors from the Delphi survey, followed by two user committee meetings. The expert meeting consisted of six experts; professors of sports pedagogy, sports sociology, and sports psychology, as well as a PE junior supervisor. The user committee dealt with the application of character factors to secondary PE curriculum, phased set-up of material structure, simplifying material formats, and naming of dimensions. The experts' comments were incorporated into the structure and design of the character education program for PE. Finally, TROPHES were validated twice by seven experts including secondary principals and vice principals, PE teachers, and Korean and foreign professors.

TROPHES Character Education Program

Orientation and structure of the character education program for PE

The researchers were approached by the Ministry of Education for a new curriculum and PE development program, targeting integrated “character education” for global society. ‘TROPHES’ is an acronym for ‘The Reform Of The Physical Humanistic Education School,’ meaning a character education program with a collection of detailed lesson plans that are readily available to put into practice for PE teachers with the purpose of enhancing desired characters of K-12 students as future members of a global society.

The direction of the entire project was founded on the principles of TPACK and its three folded components. First, TROPHES is aimed to be a collection of exemplary cases for meaningful delivery of the contents (Content Knowledge). We placed the upmost emphasis on the usability of the manual rather than the formality and the organizational structure of the contents. Secondly, it is developed in a format that is applicable in various school communities and usable by any teachers with common knowledge of pedagogy, particularly PE teachers of primary, middle, and high schools (Pedagogy Knowledge). Thirdly, in the lieu of Technology Knowledge (TK), the success measure is built around an automated evaluation system, using PC and other server-connected devices (tablet PC, PDA, smart phones, etc.). The system is being developed by the Minister of Education as a part of the full

implementation of the character development program. With these concepts and approaches, the final product can be thought of as an encyclopedia of lesson plans for PE teachers throughout the nation.

Application of TPACK

TPACK (Mishra & Koehler 2006) is a framework that identifies the knowledge teachers need to effectively teach using technology. TPACK must provide pedagogical knowledge enabling teachers to set up teaching strategies using technologies fit for instructional settings, encompassing the complicated interrelationships between teachers, students, contents, classrooms, and technologies (Archambault & Crippen 2009). TPACK has three core knowledge components of PK, CK, and TK. PK refers to pedagogical knowledge concerning diverse teaching strategies and methods teachers use to enhance students' learning, while CK is the knowledge of the specific subjects they teach. TK is the knowledge of conventional and digital technologies that teachers can incorporate into their instructional settings (Mishra & Koehler 2006).

TPACK is far from a simple synthesis of PK, CK, and TK. It is a transformative knowledge where those three core knowledge components are synthesized to construct an independent knowledge structure required of teachers (Chai et al., 2010). TPACK does not simply add engineering components to existing teaching methods. Instead, it emphasizes the importance of optimal harmonization of technology application, subject content, and teaching methods in favor of classroom settings, which is why it is diversely used in primary and secondary schools and even in online education (Abbitt 2011; Lee 2011; Voogt et al., 2013).

Pedagogical Knowledge (PK)

Pedagogical Knowledge (PK) refers to profound knowledge of teaching-learning practices and procedures involving instructional goals, objectives, and strategies (Mishra & Koehler, 2006, 2009). PK includes knowledge of methods and techniques in the classroom and awareness of learners' needs and strategies in order to assess what learners understand. In this regard, TROPHEs consists of two parts. Level 1 focuses on teachers' practice of classroom management while Level 2 deals with teacher-student and student-student interactions based on instructional content. Level 1 assumes teachers take the initiative in practicing character education. As teachers are well positioned to directly interact with students in class for educational purposes, they exert absolute influence on classroom atmosphere (Jarolimek & Foster 1995). As such, the program is based on a model that views teachers' acting upon rules and humanistic virtues as one of the most effective methods for character education (Williams, 1993). Level 2 focuses on the program promoting interactions between teachers and students as well as between students themselves for character education. In other words, the interactive

relationship in and of itself between teachers and students becomes an end rather than a means, provided such a relationship has positive effects on character education in class (Galbo, 1989). After dropping redundant or overly deviant from the curriculum in the Delphi survey and expert meetings, a total of 108 TROPHEs lesson plans have been retained; 42 for primary schools, and 66 for secondary schools. Table 1, 2, and 3 are the example of topics developed for secondary schools (middle and high school). As presented in Table 1, 16 topics apply to Level 1 classroom management. Table 2 and table 3 list 50 plans for Level-2 application, involving such themes as General Areas (9), Health Activities (9), Challenge Activities (8), Competition Activities (9), Expression Activities (7) and Leisure Activities (8).

Table 1. *Level 1 Class Management (general) for School (6-12)*

Area	No.	Primary character	Topics	Compatible Technologies
General Areas	1-0-1	SC	Eye contact with students	E-mail, Discussion forums, Web site
	1-0-2	PA	School uniform in classroom, sport clothes in gym~	Application tool, Web site
	1-0-3	PA	Nice words for nice words	Application tool, Blogs
	1-0-4	SS	Put sporting gear back to its place!	Application tool, Web site
	1-0-5	PA	A well-prepared PE teacher	E-mail, Application tool
	1-0-6	PA	Be punctual in PE class	Application tool
	1-0-7	PA	Clean environment	Whiteboards, application tool
	1-0-8	PA	Positive PE teacher	Application tool
	1-0-9	PA	A teacher's word is as good as a bond	Application tool, Blogs
	1-0-10	C	Names are important for anyone	Blogs, Web site
	1-0-11	PA	Say greetings first!	Audio/video recorder
	1-0-12	PA	Our PE teacher with eyes full of love	E-mail, Blogs
	1-0-13	C	Let students dance with compliments	Application tool, Blogs
	1-0-14	PA	Respect starts with your words	Audio/video recorder, E-mail
	1-0-15	SC	You are a considerate teacher	E-mail, Blogs
	1-0-16	PA	PE with teachers	Audio/video recorder, Blogs, Web site

Note: Sense of Community (SC), Positive Attitude (PA), Self-Sacrifice (SS), Self-Confidence (C)

Table 2. *Level 2 Instructional Content (general)*

Area	No.	Primary character	Topics	Compatible Technologies
General Areas	2-0-1	SC	How to prepare the lesson today	Quiz software, application tool
	2-0-2	PA	Mutual promises are important	Web site
	2-0-3	SS	PE teachers are icons of sharing and service	Application tool, Web site
	2-0-4	SC	Equal opportunities to everyone.	Application tool
	2-0-5	PA	Multi-perspective assessment	Quiz software, Survey software
	2-0-6	PA	Solomon's choice!	Application tool, Quiz software
	2-0-7	CC	Clear communication	Application tool, Web site
	2-0-8	SC	Observe while queuing	Web site, audio/video recorder
	2-0-9	SC	Sharing body temperature	Application tool

Note: Sense of Community (SC), Positive Attitude (PA), Self-Sacrifice (SS), Communication (CC)

Table 3. *Level 2 Instructional Content (classified areas)*

Area	No.	Primary Character	Topics	Compatible Technologies
Health Activities	2-1-1	SR	Good healthy lifestyle	Web site, Blogs
	2-1-2	PA	Positive knowledge of sex in adolescence	Web site, Blogs
	2-1-3	WA	I will stay fit and healthy	Quiz software, Web site
	2-1-4	PA	We make our school safe	Multimedia tool, Web site
	2-1-5	WA	Sound body! Sound mind!	Web site, Blogs
	2-1-6	PA	Keep a yearly log	Storyboard tool, Web site
	2-1-7	PA	My diet checklist	Storyboard tool, Web site
	2-1-8	SC	I am the work-out partner	Multimedia tool, Web site
	2-1-9	PA	Check daily exercise	Web site, Blogs
Challenge Activities	2-2-1	P	Let's challenge.	Web site, Blogs
	2-2-2	C	Cheer up! You can do it, pal~	Video Recorder, Web site
	2-2-3	PSS	Let's cope with difficulties together~	Web site, Blogs
	2-2-4	PA	Our own Guinness	Video Recorder, Web site
	2-2-5	C	Little strokes fell great oaks?	Web site, Blogs
	2-2-6	C	Setting my own goals in class	Storyboard tool, Web site
	2-2-7	SR	Video self-feedback	Video Recorder, Multimedia tool
	2-2-8	SU	Keep a challenge log	Web site, Blogs

Area	No.	Primary Character	Topics	Compatible Technologies
Competition Activities	2-3-1	PA	Say nicely and act properly.	Web site, Blogs
	2-3-2	SC	We're real fair players~	Web site, Blogs
	2-3-3	SC	Let' have some fun, pal~	Multimedia tool, Blogs
	2-3-4	SC	No worries! We share ideas!	Web site, Blogs
	2-3-5	SC	The most beautiful hand in the world!	Video Recorder, Blogs
	2-3-6	Cd	Be considerate of others~	Web site, Blogs
	2-3-7	C	A winning strategist	Multimedia tool, Blogs
	2-3-8	R	Let me be the judge of it	Video Recorder/ player, Blogs
	2-3-9	Cd	Accept physical differences	Video Recorder, Blogs
Expression Activities	2-4-1	C	Express the beauty of mind with body.	Storyboard tool, CD player
	2-4-2	C	Express my dream and talent.	MP3 player
	2-4-3	SC	Hand in hand. We are one~	Video Recorder, MP3 player
	2-4-4	O	Looking for my beauty~	Video Recorder,
	2-4-5	PA	Express yourself to the music	MP3 player, CD player, Video Recorder
	2-4-6	Cd	Be a mirror	Video Recorder, CD player
	2-4-7	C	I am a tree!	Video Recorder,
Leisure Activities	2-5-1	PA	Plan and practice your leisure activities.	Storyboard tool, Blogs, Google-Map
	2-5-2	SC	Coexistence in nature.	Video Recorder, Web site, Blogs
	2-5-3	OM	I want to learn to play new sports~	Video Recorder, Blogs, Multimedia tool
	2-5-4	PA	Leisure activities with friends	Video Recorder, Blogs, Multimedia tool
	2-5-5	OM	Hit the road with sports~	Video Recorder, Google-Map
	2-5-6	SC	Our class camping project	Video Recorder, Web site
	2-5-7	PA	Appreciate various leisure activities	Video player, Web site
	2-5-8	In	Leisure activities with family	Web site, Multimedia tool

Note: Self-Confidence (C), Consideration (Cd), Communication (CC), Initiative (In), Originality (O), Open-mindedness (OM), Patience (P), Positive Attitude (PA), Problem-solving skills (PSS), Sense of Community (SC), Self-regulation (SR), Self-understanding (SU), Self-Sacrifice (SS) Responsibility (R), Willingness to act (WA)

Content Knowledge (CK)

Content Knowledge (CK) refers to the knowledge of content components of actual subjects learned or taught (Mishra & Koehler, 2006, 2009). CK bears on teachers' understanding of concepts, facts,

theories, and procedures of the knowledge they teach and their conceptual or theoretical connectivity. In fact, as character factors vary widely in school contexts, it is necessary to prescribe the core character factors pursued in PE classes among various character factors that may be enhanced via physical activities. Hence, in the current project ‘core character factors’ is defined by the 4 core factors adopted from Cha, Kim, and Huh’s 2013 national study. The four core character factors are namely confidence, a sense of community, self-sacrifice, and positive attitudes. Also, the character factors prescribed in the established primary and secondary PE curriculums are employed as the ‘character factors of the subject character factors (see Table 4)’. The core character factors apply to every level and area. In sum, a total of 81 character factors are included in TROTPHES, 42 for primary curriculum and 39 for secondary curriculums. These character factors reflect the current K-12 PE curriculum, core character factors, and the additional factors found from TROTPHES.

The personality factors found from TROTPHES overlap with the dimension of the current K-12 curriculum. For example, the current system was built upon the consideration of Physical Health, Challenge, Competition, Creative Expression, and Leisure, which were closely related to students’ personal character development. Wynne (2011) suggested that progressive, diversified, and immersive teaching methods applied in the peer group settings fundamentally increases the possibility of students’ proper character development. Therefore, TROTPHES is applicable to PE lessons as materials for searching character factors associated with students’ physical activities in the course of setting up character goals, developing lesson plans, and assessing the outcomes of lessons.

Table 4. Character factors in primary and K-12(PE) curriculums and character CK in TROTPHES

Item		Area-specific character factors				
		Health Activities	Challenge Activities	Competition Activities	Expression Activities	Leisure Activities
Primary school PE curriculum Character factors	3~4th grades	Self-awareness Autonomy	Perseverance Courage	Compliance Cooperation	Body perception Physical adaptability	Love for family Respect for tradition
	5~6th grades	Self-understanding Agility	Discovering problems Self-regulation Respect for others	Self-responsibility Etiquette in exercise	Diversity Originality	Sense of community Love for nature
Secondary school PE curriculum Character factors	7~12th grades	Self-regulation Self-respect Willingness to act	Patience Confidence Problem-solving skills	Fair play Teamwork Consideration & Respect Sportsmanship	Originality Ardor Respectful attitude towards multi-culture	Interest Commitment Co-existence Open-mindedness

Item		Area-specific character factors				
		Health Activities	Challenge Activities	Competition Activities	Expression Activities	Leisure Activities
TORTPHES character factors	Subject character (primary)	Trust, Consideration, Cooperation, Self-regulation, Discovering problems, Respect, Esteem, Communication, Responsibility, Initiative, Empathy, Autonomy				
		Autonomy, Patience, Responsibility, Communication, Respect for others, Self-regulation, Self-understanding, Consideration	Autonomy, Perseverance, Self-regulation, Discovering problems, Respect, Consideration, Initiative, Patience	Cooperation, Fairness, Perseverance, Responsibility, Self-regulation, Respect for others, Empathy, Autonomy, Consideration	Creativity, Communication, Cooperation, Positive affect, Responsibility, Consideration, Pro-activity, Respect, Empathy	Respect for tradition, Creativity, Initiative, Cooperation, Challenge, Love for family
	Core character	Confidence, Sense of community, Self-sacrifice, Positive attitude				
	Subject character (secondary)	Trust, Consideration, Responsibility, Compliance, Empathy, Respect, Sense of ownership, Achievement, Self-regulation, Truthfulness, Self-esteem, Cooperation, Communication				
Self-regulation, Self-respect, Willingness to act, Self-control, Responsibility, Achievement, Autonomy, Respect for others		Patience, Perseverance, achievement, Courage, Cooperation, Self-reflection, Problem-solving skills, Self-control, Autonomy, Consideration, Achievement, Self-understanding	Respect, Cooperation, Responsibility, Consideration, Empathy, Cooperation, Autonomy	Originality, Cooperation, Self-understanding, Self-esteem, Ardor, Patience, Consideration, Empathy	Interest, Commitment, Open-mindedness, Love, Respect, Trust, Initiative, Pro-activity	

Technology Knowledge (TK)

Technology Knowledge (TK) concerns technologically advanced standards such as the internet and digital video beyond books or blackboards. Specifically, TK includes computer literacy required to operate software, e. g. word processors, spreadsheets, web browsers, and emails and the ability to install and uninstall hardware. For the assessment and analysis of character in TROTPHES, this study applies the components of user measurement model suggested by Doll and Torkzadeh (1988) to the student and parent service in NEIS. That is, TROTPHES -based services are categorized into three components, content usability, service applicability, and user-friendliness, to survey the perception of users (DeLone & McLean 2003), and further to help teachers provide character-related assessment information to determine the intensity of instructional programs and the types of participation needed for students. Basically, the assessment in TROTPHES is intended for the standard-based assessment

system, which is to assess ‘what and to what extent students feel and achieve,’ not ‘who does better’ as per relative ranks. The standard-based assessment system is designed to assess students’ academic achievement levels by focusing on the degree to which they meet subject-specific standards for achievement based on curriculums (Ministry of Education, Science and Technology 2013). The assessment is used to provide information for teachers to apply to their actual lesson plans in ways that changes in students’ attitudes towards phenomena arising in PE are presented tangibly and explored, that relevance is inferred, and that students’ understandings and experiences are investigated and then analyzed (see table 5).

The character-related achievement level description in PE is viewed as a qualitative differentiation of students’ achievement levels, in the sense it would be better to link to performance assessment of students. The achievement levels of PE subject can be used as the reference for qualitative differentiation of the scoring standards for performance assessment. To be more specific, for each observed item, ○ and × symbols score +1 and -1, respectively. For each group, A is equivalent to 10 or higher in every item, while B and C correspond to 4-9 and 3 or lower, respectively (Ministry of Education, Science and Technology 2012; re-quoted).

Table 5. PE activity sheet sample (Assess processes not results: Automatically linked to NEIS System)

Name \ Item	① Understanding motions	② Expression skills	③ Cooperation +Consideration	④ Confidence + Positivity
Student A	○○×	○	○	○○○
Student B	×	×	○	○
Student C	○	○○	×××	○
Student D	○	×	×	○○○
Student E		○○	○	×
Student F	○○○	×		○
Student G	×		○	○
Student H	○○	×		
Student I		○	×	×
Student J	×	×	○	×

※The teacher calls out numbers below when you:
 ① Perform activities correctly. / Act upon correct understanding of motions.
 ② Move rhythmically. / Move confidently and naturally.
 ③ Compliment other people on their strengths. / Co-operate with others. / Help others.
 ④ Participate in activities proactively. / Engage in activities wearing a bright facial expression.

Conclusion and Implication

The present study is intended to present the concept and direction of a character education program for Korean primary and secondary PE classes, clarify TPACK-based components easily and iteratively applicable to PE lessons as well as lay the foundation of consistent practice of character education in diverse PE class settings. The Character Education Partnership in the US advocates that “comprehensive, intentional, proactive and effective approaches” should be used to develop students’ personality, and that school communities as a whole should serve as a venue for individual’s development to provide students with opportunities for moral acts and to enable teachers to share responsibilities for character education so that students can learn and participate as moral members of the larger society (Schwartz, 2008). Thus, the TROPHPES materials are presented here on the grounds that a character education program for PE should be developed in line with different levels of schools and students and that such a program should be iteratively applied by teachers.

As an A to Z of character education in PE lessons, TROPHPES encompasses the content requiring intentional efforts from the basic character education in PE and is designed to be applicable to instructional plans in the form of a TPACK-based character education for PE. Thus, the content of TROPHPES may have been practiced in PE class already. Still, the significance of character education is conferred upon its materials. This program will hopefully appeal to teachers who seek to put character education into practice via PE, prove conducive to character education in PE, and be used consistently and iteratively. Taken together, the following suggestions should be made. First, future studies should develop a character program linking schools with families as well as teachers. Berkowitz(2005) states parental cooperation is highly important in character education, which implies that schools should play a pivotal role to help parents and children develop ideal relationships and raise the quality of parent-children interactions by devising parenting programs and encouraging parents and children to spend time together (KEDI, 2013). Thus, TROPHPES programs should allow for the relationships between schools (teachers), students and parents.

Secondly, character education as well as relevant research is challenging because the term character is not explicitly defined and the concept of character education is not clarified, which indicates that the definition and concept should be established so that character education can be customized with distinctive characteristics of each school and class taken into account (Jee, 2013). Hence, with the concepts of CK and PK, the materials for character education in PE should be developed continuously and added to each area of TROPHPES. Third, TK is not just about using technology but also about applying technology to tasks or development of thoughts. Therefore, TROPHPES -based assessment tools should be developed in ways that, first, individual PE teachers can apply the materials to their lesson plans and, second, character factors possibly enhanced via PE should be listed legibly for easier assessment.

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