

The Use of Information Communication and Technologies Tools to Maximize Students' Learning in Physical Education in Singapore Schools

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KEY IMPLICATIONS

- The study found that teachers would benefit from capacity-building efforts towards increased professional development in the areas of Information Communication and Technologies (ICT) use, both in terms of pedagogical knowledge/approach and the various technology-related platforms/devices which they can use.
- The study provided insights from teachers and students on how ICT's potential as a pedagogical device can be better leveraged by teachers to support student learning.
- Differences found in PE teachers' attitudes towards ICT provided a better understanding of the way ICT is used across diverse groups.

BACKGROUND

With the Ministry of Education's (MOE) focus on using ICT in resourceful and innovative ways to improve teaching and learning (MOE, 2014), PE teachers should be trained and equipped with strategies to create environments where students are given more autonomy to decide 'what' to learn and 'how' to learn, according to their ability to use ICT. For example, making available e-learning materials (McNeill, Lim, Wang, Tan, & MacPhail, 2009; Tearle & Golder, 2008) related to the lesson before and after the class affords students opportunities to learn

more readily on their own than when these materials are absent (Collins, 2011; Casey, Goodyear, & Armour, 2017).

Using video recordings to provide visual and verbal feedback from the teacher or among peers for skill performance during a lesson is just one of many ways ICT can be used to maximise students' learning and develop the affective, psychomotor, and cognitive domains set out in the PE syllabus. The advantages of providing students with opportunities to harness ICT can be directly beneficial for skills acquisition and indirectly for honing life skills.

FOCUS OF STUDY

The purpose of the research was to conduct a baseline study to understand: a) to what extent schools are using ICT tools in the teaching of PE, and b) to look at good ICT practices used by PE teachers to maximise students' learning and develop their cognitive, psychomotor, and affective domains in PE.

KEY FINDINGS

- Survey results from the first phase of the study, which is the quantitative phase, show that the extent to which ICT tools are used in PE lessons can be seen by observing the differences in PE teachers' attitudes towards

ICT based on varying teaching experiences. In terms of computer literacy as well as innovative and modern teaching-related areas, male teachers seem to have more positive attitudes than female teachers. Moreover, teachers who are 40 years old and above were found to show more positive attitude towards the use of ICT in PE compared to their younger counterparts.

- Results from the first phase of the study also show that teachers who have been in the teaching profession for a longer period of time show more positive attitude towards the use of ICT in PE. This is contrary to what was reported in past research (which suggested that younger teachers or teachers with less teaching experience are more likely to accept the use of ICT in PE).
- Based on qualitative data yielded by the second phase of the study, teachers are using ICT tools in PE lessons as a pedagogical tool to improve teaching and learning, in varying extents and degrees. Both teachers and students recognise the benefits of ICT in PE lessons, particularly in the following areas: enhancement of cognitive and affective learning, providing evidence for feedback, reference for learning, and enhancing engagement and support for self-directed and collaborative learning.
- The challenges in the use of ICT in PE involve balancing activity time with the use of ICT devices and gadgets, and designing impactful lessons that can weave in the use of ICT tools in a pedagogically sound and effective way such that time for activity is not sacrificed. Furthermore, it is a challenge to ensure that the goals of physical movements as well as an opportunity for lesson innovation are both evident in the lesson. In addition to these, technical difficulties involving wi-fi connection should be addressed.
- In terms of identifiable good practices involving the use of ICT in PE lessons, the key elements involve the following: effective introduction of ICT to young learners by allowing them to transition to the habit of using ICT in PE; harnessing ICT tools in innovative and resourceful ways that could resonate with the experiences of young people and therefore promote better engagement during PE lessons; use of ICT tools to enhance visual and verbal feedback for improving performance during PE lessons; and the use of ICT to create an autonomous learning environment for students.

SIGNIFICANCE OF FINDINGS

Implications for practice

- The study allowed for participants' articulation of the need to level up the ICT proficiency of teachers (in terms of its use and potential as a pedagogical tool) as early as during pre-service training.
- Evidence from the ground shows the viability of technology used by teachers, in particular, the use of videos as a potential tool to aid periodic evaluation and assessment of student movement and performance improvement, as it provides a mechanism that allows feedback and learning reference/review.

Implications for policy and research

- Differences found in PE teachers' attitudes towards the use of ICT in PE lessons provided a better understanding across diverse groups. These findings revealed which specific groups required extra attention, and this allows policymakers and stakeholders of educational institutions to plan specific strategies for different targeted groups to promote the use of ICT in PE.

Proposed Follow-up Activities

- The study's findings reveal that teachers will benefit from capacity-building efforts towards increased professional development in terms of ICT use, both in terms of pedagogical knowledge and the various technology-related platforms/devices which they can use.

PARTICIPANTS

Study 1

The extent of use of ICT tools in the teaching of PE — Quantitative

Using convenience sampling methods, data were collected from 422 in-service PE teachers. The sample consisted of 283 male and 139 female teachers from 152 schools across Primary (218), Secondary (171), and Junior College (32) levels (1 did not report the school level).

Study 2

Best practices in using ICT in PE — Qualitative

Eleven PE teachers from seven Primary Schools, three Secondary Schools and one Junior College were purposefully recruited from different parts of Singapore, based on the list of schools that have participated in Study 1. Recommendations were also sought from school principals, Heads of Department for PE, as well as Physical Education and Sports Teacher Academy to help identify potential participants for this study.

RESEARCH DESIGN

The study employed mixed methods using both qualitative and quantitative methods to gather data and answer the research questions. For Study 1, descriptive, quantitative results were derived from questionnaire data to understand PE teachers' attitude in using ICT in PE. For Study 2, qualitative results were derived through thematic analysis of interview transcripts to address the research questions.

REFERENCES

- Casey, A., Goodyear, V. A. & Armour, K. M. (2017). Rethinking the relationship between pedagogy, technology and learning in health and physical education. *Sport, Education and Society*, 22(2), 288-304.
- Collins, O. (2011). The use of ICT in teaching and learning of physical education. *Continental Journal of Education Research*, 4(2), 29-32.
- McNeill, M., Lim, B. S. C., Wang, C. K. J., Tan, W. K. C., & MacPhail, A. (2009). Moving towards quality physical education: Physical education provision in Singapore. *European Physical Education Review*, 15(2), 201-223.
- Ministry of Education Singapore, Student Development Curriculum Division. (2014). *Physical Education Teaching and Learning Syllabus (Primary, Secondary and Pre-University)*. Retrieved from https://libris.nie.edu.sg/sites/default/files/2018-12/2014_physical_education_syllabus.pdf
- Tearle, P., & Golder, G. (2008). The use of ICT in the teaching and learning of physical education in compulsory education: How do we prepare the workforce of the future? *European Journal of Teacher Education*, 31(1), 55-72.

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