#### **PAPER • OPEN ACCESS**

# A Comparative Study of ICT and Conventional Teaching Roles in Boat Class of Coastal Areas

To cite this article: Supriadi Torro et al 2021 J. Phys.: Conf. Ser. 1899 012171

View the article online for updates and enhancements.

## You may also like

- Improvement of Teacher's Ability to Make IT-Based Teaching and Evaluation Materials Using Scribe, Camtasia and Quiz Creator (Case Study in SMK Negeri 1 Tembarak, Temanggung, Central Java, Indonesia)

E K Nurnawati, E Sutanta and R D Bekti

- Indonesian Language Teachers' Attitudes toward ICT Utilization in Learning for Elementary School in Surakarta K Saddhono, I Mulyaningsih, I K Sudarsana et al.
- Revolution or flight from reality? The IoP Education Group Conference 1999 Ken Dobson



# ECS Membership = Connection

#### ECS membership connects you to the electrochemical community:

- Facilitate your research and discovery through ECS meetings which convene scientists from around the world;
- Access professional support through your lifetime career:
- Open up mentorship opportunities across the stages of your career;
- Build relationships that nurture partnership, teamwork—and success!

Join ECS! Visi

Visit electrochem.org/join



**1899** (2021) 012171 doi:10.1088/1742-6596/1899/1/012171

# A Comparative Study of ICT and Conventional Teaching Roles in Boat Class of Coastal Areas

# Supriadi Torro<sup>1\*</sup>, Lasunra<sup>2</sup>, A. Octamaya Tenri Awaru<sup>3</sup>, Muh. Ridwan Said Ahmad<sup>4</sup>, Zainal Arifin<sup>5</sup>

<sup>1,3,4,5</sup>Departmen of Sociology Education, Faculty of Social Sciences Universitas Negeri Makassar, Indonesia

#### **ABSTRACT**

This research aimed to explore the roles performed by ICT teachers and conventional ones in the implementation of boating class for coastal students in Pangkep Regency. It is specifically focusing on roles as educators, mentors, managers, and evaluators. The research used descriptive qualitative approach. Two ICT teachers and two conventional ones were taken as the subjects of the research using purposive sampling technique. The results of the research showed that (1) In educating role, both ICT and conventional teachers act as models who possess emphatic feeling towards their students and environment. If the conventional teachers teach students at boat class conventionally using printed modules, the ICT teachers make use of ICT applications such as Whatsapp beside the use of printed modules, (2) In mentoring role, conventional teachers display their patience and loyalty to provide unrestricted knowledge to students inside and outside the classroom whereas ICT teachers provide students with more flexible services using social media applications in discussing the student worksheet and giving feedback, (3) In managerial role, conventional teachers organize the class directly so that the class becomes quiet, convenient, and students do not disturb each other. Differently, ICT teachers manage the class virtually from planning to evaluation. The teaching materials and worksheet are not only given in printed modules but also uploaded online via Whatssapp. and (4) In evaluating role, onventional teachers evaluate the students' cognitive competence by using printed test. However, ICT teachers make use of technological aids in evaluating students' competence and skill. The test is made in google form and its link is sent to students so that the students can do it wherever and whenever they are available.

Keywords: ICT Teacher, Conventional Teacher, Boat Class, And Coastal Students

## 1. Introduction

A teacher is a person who teaches knowledge to other persons. In daily life, teacher refers to his specific tasks or roles to teach, educate, guide, train, assess and evaluate his students [1][2][3]. With these tasks, teachers are demanded to develop their profession either in group or individually. In implementing the tasks or roles, teachers may have various ways in terms of facilities and skills they have. More specifically, when teacher have to play these roles in coastal areas where students can study a school lesson while helping their parents fishing on a boat [4].

Teacher has significant roles in developing the quality of human resource in one country That is why, when a teacher gets a problem, then education in that country is in trouble as well..It must be acknowledged that one unresolved phenomenon in our country is the problem of education, especially the problem of teachers. A number of opinions and discourses consider that Indonesian education has become a tangled threat which is difficult to disentangle. This is especially true when talking about

Published under licence by IOP Publishing Ltd

<sup>&</sup>lt;sup>2</sup>English Education, Faculty of Languages and Literature, Universitas Negeri Makassar, Indonesia

<sup>\*</sup> Email: supriaditorro@unm.ac.id

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

**1899** (2021) 012171

doi:10.1088/1742-6596/1899/1/012171

schools, many parties put forward their ironic and skeptical expressions. Giddens, Anthony claims that many school buildings are like chicken coops [5][6]. Similarly, argues that school is paradoxical because on the one hand it glorifies creativity, but on the other hand it silences children's creativity [7][8]. This is in accordance with the National Education System Law No. 20 of 2002 stating that:

"education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, nation and country" [9][10]

As an activity that is aware of the objectives, education is centered on the interaction between educators and students in an effort to help achieve educational goals. The purpose of education will be realized if the teaching process goes well with a pleasant atmosphere for all parties [11][12][13]. This condition has been pursued by the Government of Pangkep District, so that school-age children continue to learn wherever and whenever they are. According to data from Pangkep District in Figures , it is stated that Pangkep District is a District consisting of lands, seas and mountains. Similarly, there are 13 subdistricts with a total of 115 islands scattered within the archipelago. Residents who inhabit the islands of Pangkep District generally work as fishermen to earn their life. When parents sail at sea for their occupation, they usually include their children to help them work at sea in order to fulfill their daily lives [14].

This situation described above makes a number of children who do not attend school or drop out of school and do not continue their education because they choose to go to sea to be able to help the parents make a living. Therefore, the world of education symbolizes the sea as the main source of life [15][16][17]. The number of children who depend their lives on the sea are so big. These children need to have competence to manage their life and education. For them they have the right to obtain a proper education for their lives. For this reason, the government of Pankep District has created a specific program called "Boat Class Program". This program serves an alternative solution in overcoming problems existed in the archipelago. Within this program, students are given assignments through worksheets with an independent learning system [18]. This approach is considered very helpful so that children who go to sea because they help their parents earn a living can still get an education and are registered as students in their respective schools. This boat class has been going on for about 2 years. However, this approach is still restricted for basic education and limited to the North Liukang Tupabiring sub-district. Boat Class service "is a place of learning for students on the boats they use to go to sea. as an educational service in the District islands.

### 2. Method

This research was conducted in the islands of Pangkep Regency, South Sulwesi specifically in North Tupabiring Subdistrict. The research data were collected through observation, in-depth interviews and documentation. Observation data were collected directly through student and teacher activities. Indepth interviews were conducted at the teachers' and student's homes or at a place that has been previously agreed [19][20]. Documentation data were data deriving from the teacher or student records who become the subjects of the research. Documentation was also taken from various policies taken by the district education office. The results of the study were analyzed through the model of consisting of data condensation, data presentation / display and conclusion drawing [21][22].

#### 3. Results and Discussions

The roles a teacher performs in the boat class may be described in four categories: 1) as an educator; 2) as a mentor, 3) as a manager; and 4) as an evaluator. The comparative description of these four roles between conventional teachers and ICT teachers are presented in the following table.

CONVENTIONAL	ROLES	ICT TEACHER	
TEACHER			

WEAST 2020 IOP Publishing

Journal of Physics: Conference Series **1899** (2021) 012171 doi:10.1088/1742-6596/1899/1/012171

Motivate students directly and advise students by heart so that the boat class students remain motivated and enthusiastic to learn	Educator	Educate students with ICT facilities. Here, students learn a lot in online settings, they learn about discipline so that they do not repeat the same mistakes.
Guide and supervise the students directly at school, at home, at the bank of the beach or wherever they are. Similarly, they provide them with worksheet, explain, and respond to the students' questions.	Mentor	Utilize mobile phone in guiding the students to learn, remind them the tasks to do, correct the students' work and return it to them using the online mobile phone
Organize the class directly so that the class becomes quiet, convenient, and students do not disturb each other	Manager	manage the class virtually from planning to evaluation, and the teaching materials and worksheet are not only given in printed modules but also uploaded online via Whatssapp. By so doing, the students have chatting and uploading skills.
Directly collect data and information on students' learning achievement from the students. With this role, teachers understand the students' compentence and curriculum absorption and at the same time teachers know the extent of success they reach toward the program they have established.	Evaluator	Make use of technological aids and internet connection in evaluating students' competence and skill. The test is made in google form and its link is sent to students so that the students can do it wherever and whenever they are available.
(Source: In Donth Interview Transce	ript 2020)	

(Source: In-Depth Interview Transcript, 2020)

The role of educating is one of the most important teacher roles in improving student learning outcomes. The role of educating involves a process that explains the existence of an intensity, perseverance, and direction of the individual to achieve a predetermined goal. The role of the teacher in educating students who take boat classes is to give direction to students so that the students continue to be active in taking their lessons eventhough they are not completely full as the conventional classes do [23][24].

As stated by the informants that "the process of educating the students must be from heart to heart. By providing Student Worksheets that have been completed with the steps that must be done, the students are truly given the opportunity to learn and ask questions, until they can do and complete the worksheets". This role might be effective if teachers can attend the class physically. However, detail manual or instruction of how to do the worksheet and relevant learning tasks may also be given online without the teacher's attendance in the class.

Explaining to students according to their enthusiasm certainly requires patience and high tolerance, because students will not do their assignment without the teacher giving the right education for them. "We agreed to meet up, wherever they have the opportunity and time. Persuading students to study and go to school is our task which should not be boring. Our students are our future on this island. We must influence the students who are lazy by visiting their homes, and even visiting them wherever they are," said by one teacher. The teacher gives them a model that wherever and whenever we are, books must be carried on and read if they have the opportunity. In this way the teacher wants to show his students that the responsibility for the task does not recognize the time and place to complete it. As a teacher, he tries to be a role model for students and instill social values and discipline. What was

**1899** (2021) 012171 doi:10.1088/1742-6596/1899/1/012171

promised was proven so that none of the students felt that they were being treated and ignored. Educating children, especially if there is a lack of motivation, is really extraordinarily difficult felt by a teacher. The student's intention to go to the boat class is almost as big as his unwillingness to go to school. Therefore, if the teacher is not strong enough to provide education and influence, then it is certain that students will drop out of the program and do not continue their study.

Another important role of the teacher in implementing boat classes is to become a mentor. With this role, the teacher must be the student's companion in order to discover the various potentials possessed by the students. In addition, the teacher must also accompany the students in order to achieve and carry out their developmental tasks, so that with this achievement students can grow and develop into students independence. This role is in fact better played by the conventional teachers who can physically get together with their students. On the other hand, the ICT teachers provide students with more ample and flexible opportunity to discuss their learning problems online and receive constructive feedback via Whattsapp.

The mentoring process goes from heart to heart [25][26]. In this way, the teacher gives the complete worksheet equipped with the steps that need to be taken, explains to students when not attending the class, makes an agreement where they can meet and explains about the assignments given and asks if there is anything the student needs to do in the worksheet.

The teacher's role as a mentor in a boating class is very important and can even be said to be a central part of the boat class. If teachers no longer perform their mentoring role, then it is very likely that the boat class students will not study anymore and may even drop out of school. The role of teachers in guiding boat class students is very important. This is in accordance, that the role of teachers' mentoring is to encourage the development of positive behavior in students and help them solve problems they experience in learning [27]. Similarly, this idea is also in line, who argues that the teacher as a mentor helps students to find the potential they have as a skill for their lives [28][29]. Teachers need to mentor their students in order to be able to achieve and carry out their developmental tasks, so that they can grow and develop as ideal human beings who realize the expectations of their parents and society.

Another signifiant teacher's role is managerial role. With this role, teachers manage the class in order that it becomes organized, convenient, and the students do not disturb each other when they are learning. Such a role may be best accomplished by conventional teachers who can physically get together with their students in the class. However, the role may also be performed without the teacher's physical attendance in the class. Teachers with ICT skills can manage the class virtually from planning to evaluation, and the teaching materials and worksheet are not only given in printed modules but also uploaded online via Whatssapp. By so doing, the students have chatting and uploading skills.

Managing a boat class student is not the same as managing students in a regular school. Boat class students often do not enter the class, or come to the class but late. That is why the teacher must have sensitivity because they cannot reprimand why they are late or why they did not attend school the day before. These seem trivial questions but they may result in students dropping out of school. The teacher teaches students in class. If the students are late, they are kept on learning, but they are persuded to adjust their lesson.

In delivering the teaching material to boat class students, the teacher becomes a facilitator so that the students may easily accept it. The learning atmosphere, learning facilities, and students' abilities which are far below the standard make teachers try their best to repeat and make appropriate classifications for their students to absorb the lesson [30][31].

For teachers, teaching in boat class, only deals with the substance of teaching material whereas discipline in dress code cannot be applied strictly if the teacher wishes to prevent the students from feeling under pressure. The common phenomenon is that when they go home from the sea, boat class students usually go straight to school and do no longer change their clothes [32]

Another important role of the teacher in boat class is to evaluate the progress of students where the teacher helps students in achieving the general goals of education that have been set. The teacher's way of evaluating students who take boat classes is giving assignments to students before going to sea.

WEAST 2020 IOP Publishing

Journal of Physics: Conference Series

**1899** (2021) 012171 doi:10.1088/1742-6596/1899/1/012171

There is a different treatment that teachers do in boat class compared to regular classes. Students in boat class do not focus on their cognitive competence in which students must be able to answer the questions given, but rather on the willingness to do what is assigned by the teacher. The teacher gives assignment through worksheet, and if they have answered or done the worksheet, then the teacher can already give them a good grade. In evaluating learning through tests, of course the boat class students are made questions that are relevant to the tasks done through these worksheets.

Evaluating the learning process made by teachers is not intended to determine the achievement of student competencies, but rather on changes in enthusiasm and motivation for learning. This method looks appropriate, because since the adoption of the boat class policy by the government, it appears that the boat class students who drop out of school have begun to decrease in number. The spirit of learning and going to school has changed in a positive direction, so it can be predicted that boat class students will all go to school to a higher level. From the results of this study, according to [33], that all educators and people who care about education need a diverse understanding of educational theory. In this connection, humanistic theory is very relevant to the conditions described in this study. Humanistic theory explains that basically all parties have the goal of learning to humanize humans. Therefore, the learning process can be considered successful if the learner has understood himself and his environment. In other words, learners in their learning process must strive in such a way that gradually they are able to achieve self-actualization as well as possible.

Learning that utilizes a lot of student worksheets to be done by the students themselves and with teacher's mentoring has become a model and learning capital for boat class students. They learn and do their worksheets while working, during their free time or waiting for the results of pairs of nets or racks. The learning behavior of the students in boat class is in accordance with the theory of constructivism. In this theory, it is stated that students gain knowledge is due to students' activity themselves. This theory assumes that a learning process must condition students to do an active process of building new concepts, new understandings and new knowledge based on empirical data. Therefore, the learning process must be designed and managed in such a way as to be able to encourage students to organize their own experiences into meaningful knowledge.

This theory can be a philosophical base of analysis that teachers must encourage and accept students' autonomy, and respect students' thoughts which are directed at their ability to achieve learning competence [34][35]. The student worksheets given to them are not a limited assessment if there are questions that cannot be answered by the students. The teacher must accept students' answers well whether they are all correct or partially wrong. Thus, this practice becomes a medium for proper learning reflection. In order to internalize and implement constructivist learning, the teacher first changes his mind based on the foundation of constructivism [36]. For this reason, the teacher's characteristics can be seen in his behavior, such as respecting students'initiative and autonomy, utilizing data to appraise student thinking skills, and prioritizing student performance in doing their assignments and developing their curiosity by providing sufficient opportunities for students to perform given tasks. Learning independence of boat class students according to this theory is highly appreciated, regardless of the level of achievement of their competencies. The motive for performing and doing all the tasks that the teacher gives to students is the proper application of constructivism [36].

As a policy, the boat class has greatly contributed to the government of Pangkep Regency, especially in the context of providing educational services to the community. The local government received high appreciation from the central government. That is why the local government of Pangkep District was given an award as an education district.

From the perspective of public service theory, the boat class can succeed because of two main factors. First, the commitment of the government and second, the competence of the parties that carry it out. In accordance with the contingency theory initiated by James Lesther as quoted in, in which he proposed a proposition stating that the success of implementation was strongly influenced by two factors, namely the commitment and the capacity of the government in conducting a program.

The two aforementioned factors may be related to changes in the order of services in our country through the progress of regional autonomy today. Commitment from a local government is needed in

**WEAST 2020** 

IOP Publishing Journal of Physics: Conference Series **1899** (2021) 012171 doi:10.1088/1742-6596/1899/1/012171

order to design, implement and evaluate a program that has been prepared. Commitment is not a rhetoric that was only conveyed during the campaign, but implemented in the real world. The same thing is true for the capacity. Eventhough the government has a commitment but the capacity the government has is lacking, it is certain that the region will not advance as expected. There are many regions in our country that have adequate natural and financial resource capacities, but this does not significantly indicate the advanced development in the region due to the low commitment and capacity of the local government.

#### 4. Conclusions

The roles that the conventional and ICT teachers play in implementing the boat class progrm is to be a patient educator, a tireless mentor, a wise manager and an effective evaluator. Among the four roles, the conventional teachers were prominent in educating and mentoring whereas the ICT teachers were prominent in managerial and evaluating roles The boat class program can be carried out well despite having limited resources of information and facilities. Boat class teachers feel the difficulty of educating. guiding, and evaluating if there are questions in the student worksheet that are not understood by students. The difficulty in educating boat class students is compounded by the absence of friends who want to be invited to the discussion, as well as the absence of a companion or mentor teacher as a place for students to ask questions. Therefore, teachers and principals must have extra time and spend adequate budget to facilitate boat class students. The cost of photocopying the student worksheet that the principal normally spends seems to be insufficient, because other costs must also be incurred. Likewise, the problem of time spent by the teacher to take care of the boat class students. After the school hours, the teacher usually goes home or goes wherever they want. However, teachers who have boat class students must take more time to meet with students, not only to give worksheets to their students, but must also provide an explanation in advance about how to do the worksheets and even provide assistance and mentoring to students in working on these tasks. To maximize the teachers' roles in the boat class students, teachers are recomended to implement blended learning.

### Acknowledgments

We would like to extend highly appreciation to Universitas Negeri Makassar, the Faculty of Social Sciences for sponsoring the writing of this article and to the research informants, especially the teachers, school principals, school committes, parents and coastal students who provided valuable information in this research.

#### References

- [1] M. Claro et al., "Teaching in a Digital Environment (TIDE): Defining and measuring teachers' capacity to develop students' digital information and communication skills," Comput. Educ., vol. 121, pp. 162–174, 2018.
- J. T. M. Gulikers, P. Runhaar, and M. Mulder, "An assessment innovation as flywheel for [2] changing teaching and learning," J. Vocat. Educ. Train., vol. 70, no. 2, pp. 212–231, 2018.
- M. Napal Fraile, A. Peñalva-Vélez, and A. M. Mendióroz Lacambra, "Development of digital [3] competence in secondary education teachers' training," Educ. Sci., vol. 8, no. 3, p. 104, 2018.
- [4] C. E. Matthews, S. Thompson, and S. C. Payne, "Preparing Informal Science Educators in a Formal Science Teacher Education Program: An Oxymoron?," in Preparing Informal Science Educators, Springer, 2017, pp. 355–386.
- S. Johnson and D. Johnson, How to build chicken coops: everything you need to know. Voyageur [5] Press, 2019.
- F. Arcega-Cabrera and L. F. Fargher, "Education, fish consumption, well water, chicken coops, [6] and cooking fires: Using biogeochemistry and ethnography to study exposure of children from Yucatan, Mexico to metals and arsenic," Sci. Total Environ., vol. 568, pp. 75-82, 2016.
- J. Oliver, Associations: Creative Practice and Research. Melbourne Univ. Publishing, 2018. [7]
- V. P. Glăveanu and E. P. Clapp, "Distributed and participatory creativity as a form of cultural [8]

**1899** (2021) 012171 doi:10.1088/1742-6596/1899/1/012171

- empowerment: The role of alterity, difference and collaboration," in *Alterity, Values, and Socialization*, Springer, 2018, pp. 51–63.
- [9] C. Mahfud, "Evaluation of Islamic Education Curriculum Policy in Indonesia," *Prem. Educ. J. Pendidik. Dasar dan Pembelajaran*, vol. 9, no. 1, pp. 34–43, 2019.
- [10] A. Gultom and E. Daryanto, "Policy Analysis and Decision Making in The Community In Accordance with Government Regulation No. 39 of 1992 CHAPTER III Article 4 And Decree of The Minister of National Education Number 044/U/2002.," 2018.
- [11] Y. Bangura, "Multicultural Education: The Relationship Between Preservice Teachers' Multicultural Self-Efficacy and Cultural Awareness When Teaching in Multicultural Classrooms." Bowling Green State University, 2018.
- [12] C. C. Cheang, W.-M. W. So, Y. Zhan, and K. H. Tsoi, "Education for sustainability using a campus eco-garden as a learning environment," *Int. J. Sustain. High. Educ.*, 2017.
- [13] J. D. Adams and P. Gupta, "Informal science institutions and learning to teach: An examination of identity, agency, and affordances," *J. Res. Sci. Teach.*, vol. 54, no. 1, pp. 121–138, 2017.
- [14] K. S. Pangkep, Neraca Pendidikan Kabupaten Pangkep. Tidak Dipblikasikan, 2019.
- [15] G. A. Cajete and D. R. Williams, "Eco-aesthetics, Metaphor, Story, and Symbolism: An Indigenous Perspective: A Conversation," *Res. Handb. Childhoodnature Assem. Child. Nat. Res.*, pp. 1707–1733, 2020.
- [16] I. Hanaco, "I Love Homeschooling: Segala Sesuatu Yang Harus Diketahui Tentang Homeschooling," *Jakarta PT Gramedia Pustaka Utama*, 2012.
- [17] S. Torro, P. Bundu, and A. Rahman, "A Study on Homeschooling in Makassar South Sulawesi."
- [18] D. P. Pangkep, Buku Panduan Replikasi Kelas Perahu. Pangkep: Tidak diterbitkan. Not Published, 2019.
- [19] H. Wijaya, Analisis Data Kualitatif: Sebuah Tinjauan Teori & Praktik. Sekolah Tinggi Theologia Jaffray, 2019.
- [20] I. Gunawan, "Metode penelitian kualitatif," Jakarta Bumi Aksara, vol. 143, 2013.
- [21] M. Huberman and M. B. Miles, *The qualitative researcher's companion*. Sage, 2002.
- [22] M. B. Miles and A. M. Huberman, *Qualitative data analysis: An expanded sourcebook*. sage, 1994.
- [23] T. C. Howard and R. Reynolds, "Examining parent involvement in reversing the underachievement of African American students in middle-class schools.," *Educ. Found.*, vol. 22, pp. 79–98, 2008.
- [24] A. Phillipson, A. Riel, and A. B. Leger, "Between Knowing and Learning: New Instructors' Experiences in Active Learning Classrooms.," *Can. J. Scholarsh. Teach. Learn.*, vol. 9, no. 1, p. n1 2018
- [25] D. E. Harrison, "Mentoring: Eyes to See, Ears to Hear, and a Heart to Give," in *The Great Facilitator*, Springer, 2019, pp. 59–70.
- [26] A. Farinde-Wu, C. P. Glover, and N. N. Williams, "It's not hard work; it's heart work: Strategies of effective, award-winning culturally responsive teachers," *Urban Rev.*, vol. 49, no. 2, pp. 279–299, 2017.
- [27] P. Tomlinson, "Mentor Teachers' Perceptions of Effective Mentoring Strategies," 2019.
- [28] H. Y. Law, "Theorising Mentoring for the 21st Century Teaching and Learning: Making Invisible Professional Growth Visible through Action Research," in *Championing Cutting-Edge* 21st Century Mentoring and Learning Models and Approaches, Brill Sense, 2020, pp. 135–156.
- [29] S. Hvalič-Touzery, H. Hopia, S. Sihvonen, S. Diwan, S. Sen, and B. Skela-Savič, "Perspectives on enhancing international practical training of students in health and social care study programs—A qualitative descriptive case study," *Nurse Educ. Today*, vol. 48, pp. 40–47, 2017.
- [30] A. Zohar and V. Alboher Agmon, "Raising test scores vs. teaching higher order thinking (HOT): senior science teachers' views on how several concurrent policies affect classroom practices," *Res. Sci. Technol. Educ.*, vol. 36, no. 2, pp. 243–260, 2018.
- [31] J. E. Lawrence and U. A. Tar, "Factors that influence teachers' adoption and integration of ICT

**1899** (2021) 012171 doi:10.1088/1742-6596/1899/1/012171

- in teaching/learning process," EMI. Educ. Media Int., vol. 55, no. 1, pp. 79–105, 2018.
- [32] F. G. Chalmers, "Dragon Boats and Other Waka: Implications for Art Education in Aotearoa/New Zealand," in *Art, Culture, and Pedagogy*, Brill Sense, 2019, pp. 257–271.
- [33] J. Willis and M. Willis, *Based Strategies to Ignite Student Learning: Insights from Neuroscience and the Classroom.* ASCD, 2020.
- [34] N. Noddings, *Philosophy of education*. Routledge, 2018.
- [35] B. E. Bechter, J. A. Dimmock, and B. Jackson, "A cluster-randomized controlled trial to improve student experiences in physical education: Results of a student-centered learning intervention with high school teachers," *Psychol. Sport Exerc.*, vol. 45, p. 101553, 2019.
- [36] A. Beerenwinkel and M. von Arx, "Constructivism in practice: An exploratory study of teaching patterns and student motivation in physics classrooms in Finland, Germany and Switzerland," *Res. Sci. Educ.*, vol. 47, no. 2, pp. 237–255, 2017.