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ORIGINAL SCIENTIFIC ARTICLE

UNDERSTANDING STUDENTS' FREE-BODY DIAGRAMS USING THE METAREPRESENTATIONS SURVEY FOR PHYSICS

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Abstract

Study purpose. The Metarepresentations Survey for Physics (MSP) was developed to assess students' metarepresentational knowledge during physics problem solving.

Materials and methods. The survey was given to 288 introductory-level college physics students. Psychometric properties of the instrument, including construct validity, were evaluated by confirmatory factor analysis and Rasch analysis.

Results. We also examined students' beliefs about the use of free-body diagrams, as well as thoroughly examined the link between students' problem solving success and free-body diagrams.

Conclusions. We recommend the use of the MSP for physics instructors and science education researchers who want to evaluate students' free-body diagrams. Additionally, we suggest the subject of physics can be replaced with chemistry, genetics, or another science to assess metarepresentations in other domains.

Keywords: metarepresentations, free-body diagrams, construct validity, structural equation modeling, Rasch modeling.

Introduction

Representations in physics are verbal, mathematical, graphical, or pictorial depictions used by students to interpret concepts and solve problems (Supeno, Subiki, & Rohma, 2018). Metarepresentations, similar to metacognition, are what students know about their representations (Kohl & Finkelstein, 2006). Drawing a pictorial representation of the information presented, typically referred to as a free-body diagram, is an important part of physics problem solving. Physics textbooks, instructors, and researchers emphasize the importance of these free-body diagrams because they allow the problem solver to identify the involved objects and forces and the interaction between them, determine the appropriate approach to the problem, and to reduce the amount of information that must be attended to at one time (diSessa, 2004). Despite the emphasis on free-body diagrams, there is some question as to whether and how students are creating and using diagrams when solving physics problems.

Rosengrant, Van Heuvelen, and Etkina (2009) studied students in an introductory-level course for physics majors and found that although most students drew free-body diagrams, only a small portion drew them correctly by including significant components. Students who drew diagrams with those significant components were more likely to correctly solve the problems. Interviews with groups of high achieving and low achieving students indicated stark differences in the creation and use of these diagrams. High achieving students used the diagrams in two important ways: first, to help them solve problems, and second, as a way of evaluating their problem solving equations. In contrast, the low achieving students primarily drew the diagrams using the steps learned in class without having a full understanding of what components they were drawing, and furthermore, they did not check for accuracy between their diagrams and their problem solving approach. One critical finding of Rosengrant et al.'s study was that drawing an incorrect free-body diagram led to more incorrect solutions than having no diagram at all, suggesting that a wrong free-body diagram is worse than no free-body diagram.

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However, just drawing a high-quality diagram is not a panacea. Taasoobshirazi and Carr (2009) used structural equation modeling to study the relationships between the use of free-body diagrams, conceptual knowledge, strategy use, and performance among introductory-level college physics students. They found that greater conceptual knowledge was not linked to the use or quality of free-body diagrams; the use and quality of free-body diagrams was also not linked to effective strategy use. Therefore, even when students drew free-body diagrams, and drew them well, this did not result in improved strategy use or performance. Also, more advanced conceptual knowledge was not related to the use of free-body diagrams. The authors theorized that students are drawing diagrams and even including important components of the diagrams, but not actually using them to solve physics problems.

Beyond the two studies described above, there is little research on how students are using free-body diagrams when studying or solving physics problems; there is a complete lack of research on students' understanding of their free-body diagram use. Van Heuvelen and Zou (2001) found that students learn more if they understand the reason behind various pedagogical strategies such as using diagrams to solve problems. Understanding students' free-body diagram use is an essential prerequisite to teaching students this reasoning.

Metarepresentation is parallel to metacognition, but the focus is on what students know about and how they use representations (Sherin, 2000). Metarepresentation is the knowledge and regulation of one's representations rather than the knowledge and regulation of one's cognition. Given the emphasis on free-body diagrams in physics, understanding students' metarepresentational skills is an important goal. Despite its importance, there is a dearth of research on metarepresentations. Because of the lack of research on metarepresentations, the research on metacognition was used as a framework for understanding the components of "thinking about one's representations" and developing the Metarepresentations Survey for Physics (MSP; Taasoobshirazi, Bailey, & Farley, 2015).

Theoretical Framework

Metacognition is a "cognitive activity that takes as its object, or regulates, any aspect of any cognitive enterprise" (Flavell, 1985, p. 104). The research on metacognition distinguishes between two components: 1) knowledge of cognition and 2) regulation of cognition (Dinsmore, Alexander, & Loughlin, 2008). Knowledge of cognition is what individuals know about their thinking and learning and is comprised of three different types of metacognitive knowledge including declarative, procedural, and conditional knowledge (Schraw, 2001; Veenman, 2007). Declarative knowledge is knowledge about oneself as a learner or a problem solver. Procedural knowledge is knowledge about how to complete an activity or problem. Conditional knowledge is knowledge about when and why to use one's declarative and procedural knowledge.

The second component of metacognition, regulation of cognition, comprises behaviors that help learners manage their learning and/or problem solving (Dinsmore et al., 2008; Veenman 2007). Regulation of cognition includes at least three types of metacognitive regulation, including planning, monitoring, and evaluation (Schraw, 2001; Schraw, Crippen, & Hartley, 2006). Planning is described as planning and goal setting prior to completing a task or problem. Monitoring is the continuous assessment of one's goals, work, and performance during a task. Evaluation is the judgement of one's work after completing a task.

We believe there is conceptual overlap between metacognition and metarepresentation as both focus on the meta aspect of cognitive activities. Some metacognition researchers consider an additional component of regulation of cognition called information management (Schraw & Dennison, 1994). Information management includes strategies that help a learner solve problems effectively, such as using free-body diagrams, and has been studied as such (Taasoobshirazi, Bailey, & Farley, 2015). Although metarepresentation could be considered a component of metacognition, we study metarepresentations as the metacognition of representations and as its own construct that focuses specifically on the knowledge and regulation of one's diagrams.

To date, there is no inventory or assessment that evaluates students' knowledge and regulation of their use of representations in science. The Metarepresentations Survey for Physics (MSP) was designed to objectively, validly, and reliably assess students' metarepresentational skills in physics. Assessing students' metarepesentations is a necessary prerequisite for understanding how students are using free-body diagrams and how those diagrams are linked to problem solving success. Free-body diagrams are considered a critical part of the physics problem solving process and are heavily emphasized in physics classrooms and texts. We developed the MSP to evaluate the six components of metacognition discussed above. We also examined students' beliefs about the use of free-body diagrams, as well as the link between students' problem solving success and use of free-body diagrams.

Materials and methods

Study participants

Two hundred eighty-eight physics students (194 men, 93 women, and 1 non response) in two sections of an introductory level, calculus-based course at a university in the South Central part of the United States were given the 13 item MSP. There were approximately 400 students in the course. Students completed the anonymous survey for a small amount of extra credit. Regarding ethnicity, approximately 61% of the students self-identified as White, 8% Hispanic/Latino, 7% Black, 4% Middle Eastern, and 8% other. The survey was administered to students during the 10th week of classes. Informed consent was collected from students, participation was voluntary, and the study was conducted in compliance with the university's Institutional Review Board.

Organization of the study

The 13 items were developed using the research on free-body diagrams and on metacognition as well as guidelines for survey development presented by Pett, Lackey, and Sullivan (2003). These guidelines include evaluating research to identify appropriate latent variables and creating well-designed empirical indicators, or items, for those latent variables. Items

1, 2, and 3 were designed to measure procedural knowledge; items 4 and 5 measured declarative knowledge, items 6 and 7 measured conditional knowledge; items 8 and 9 measured planning; items 10 and 11 measured monitoring; and items 12 and 13 measured evaluation. Students were asked to respond to each of the 13 items on a 5-point Likert-type scale ranging from 1 (never true of myself) to 5 (always true of myself) with the instructions: "In order to better understand how you solve problems in physics, please respond to each of the following statements from the perspective of: When solving physics problems". After completing the MSP, students were asked for their gender and race and were asked the question: "Are free-body diagrams important for physics problem solving? Why or why not?"

In one section of the course, students completed a set of five physics problems. Fifty of the physics problem sets were randomly selected and analyzed. These problems were used to evaluate students' problem solving success and free-body diagram use.

Results

Confirmatory Factor Analysis

A confirmatory factor analysis using LISREL 10.2 indicated that the MSP had strong construct validity. The items, as proposed, all loaded significantly on their respective factors (using a cutoff of t = 1.96 to assess significance). The measurement model is presented in Figure 1 with items and standardized factor loadings; items, item loadings, and variance explained by the factors are presented in Table 1. All correlations between latent variables were significant. Table 2 presents descriptive statistics for the six factors of the MSP.

Table 2. Descriptive Statistics for the Six Factors of the MSP.

Factor	Mean	Standard Deviation
Declarative Knowledge	3.74	0.78
Procedural Knowledge	3.43	0.84
Conditional Knowledge	4.07	0.78
Planning	3.75	0.81
Monitoring	3.82	0.82
Evaluation	3.82	0.91

The data met the assumption of multivariate normality (Mardia's coefficient = 1.25) so maximum likelihood estimation was used to test the model. To evaluate the fit of the model, several fit indices were considered. The normed chi-square was 110.47/50= 2.21. The Steiger-Lind Root Mean Square Error of Approximation (RMSEA) was 0.06. The standardized root-mean-square residual (SRMR) was .04. The Bentler comparative fit index (CFI) was .97. The incremental fit index

Table 1. Items, Standardized Item Loadings, and Item R^2 for Physics Metarepresentations Survey

Item #	Item Loading (t value)	Item (R-squared)
Knowledge of Cognition: Declarative		
4	0.75(13.85)	When solving physics problems, I know best how to draw free-body diagrams (.56).
5	0.78(14.61)	I am a good judge of how well I draw free-body diagrams (.61).
Knowledge of Cognition: Procedural		
1	0.80(15.35)	When solving a physics problem, I know how to use a free-body diagram to successfully solve the problem (.63).
2	0.77(14.69)	I know how to draw a thorough and complete free-body diagram (.59).
3	0.82(16.02)	I know how to draw an accurate free-body diagram (.67).
Knowledge of Cognition: Conditional		
6	0.63(10.65)	I know why free-body diagrams are important for physics problem solving (.39).
7	0.83(14.27)	When solving a physics problem, I know why I'm using a free-body diagram (.69).
Regulation of Cognition: Planning		
8	0.54(9.32)	Before solving a physics problem, I draw a free-body diagram to represent the relationships in the problem (.30).
9	0.79(13.69)	Before solving a physics problem, I think about the physics concepts that go with my free-body diagram (.63).
Regulation of Cognition: Monitoring		
10	0.76(13.54)	While solving a physics problem, I think about the physics concepts that go with my free-body diagram (.58).
11	0.58(10.13)	While drawing a free-body diagram, I consider the accuracy of my diagram (.34).
Regulation of Cognition: Evaluation		
12	0.81(14.42)	After drawing a free-body diagram, I check to see if my free-body diagram is accurate (.65).
13	0.84(15.14)	I look back to see if I included all of the necessary parts of the free-body diagram (.71).

Note: On the far left are item numbers followed by factor loadings. T values are in parentheses. R-squared values are in parentheses after the items.

(IFI) was .97. These fit indices all met recommended cutoff values (e.g., Browne & Cudeck, 1993; Hu & Bentler, 1999; Kline, 2016), signifying that the model fit well.

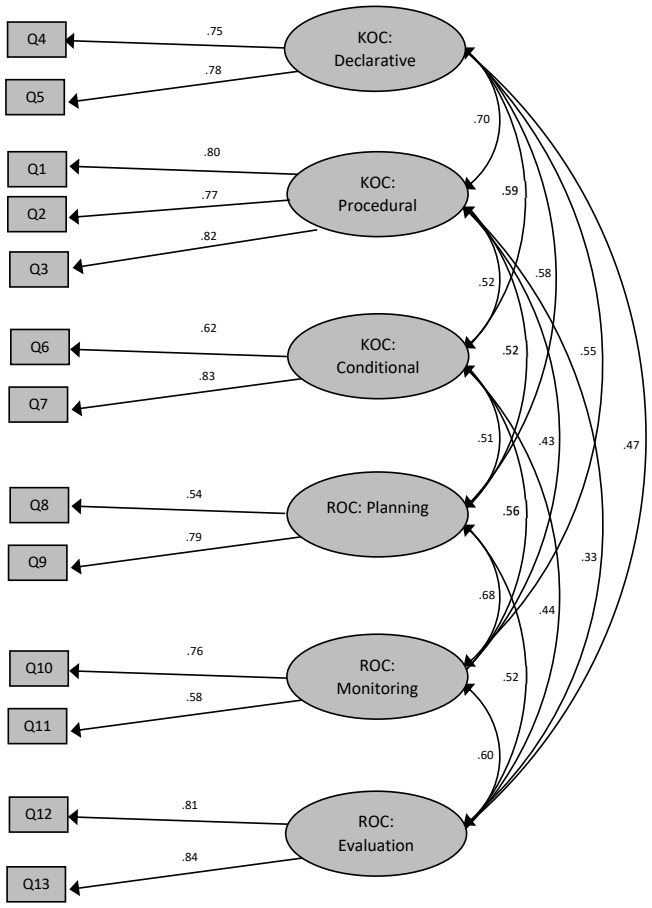

Fig. 1. Confirmatory Factor Analysis Model

Rasch Analysis

A Rasch analysis was conducted to evaluate the psychometric properties of the MSP. Rasch analysis is common technique used to evaluate the construct validity of instruments in the health and social sciences (Lim, Rodger, & Brown, 2009). We used guidelines by Boone, Staver, and Yale (2014), analyses interpretation by Taasoobshirazi, Bailey, and Farley (2015), and Winsteps 3.81 to test and evaluate the model. Table 3 presents results from the Rasch analysis: The entry number is the item's order. The total score is the sum of the raw scores of the five point Likert scale items for each item. The Rasch measure is the level of agreeablity of an item presented in logit units; items range from being most difficult to agree with at the top of the table and easiest to agree with at the bottom of the table. The mean Rasch measure is 0 and items that are easier to agree with are below 0 logits whereas items that are more difficult to agree with are above 0 logits. The model standard errors are presented in Table 1 and describe uncertainty around the item measures. The infit and outfit mean square (MNSQ) fit statistics are chi-square statistics that describe how well the data fit the Rasch model (Boone, Townsend & Staver, 2011). Values outside of the suggested ranges (less than .05 or above 1.5) indicate disparity of the data from what is expected from the Rasch model. Our values were within those ranges, suggesting that we had good construct validity (Baghaei, 2008). The point measure correlations are presented in the last column of the table. These correlations assess whether responses to items align with abilities of the persons (Linacre, 2012). Positive correlations are expected, meaning that higher person measures are linked to higher ratings on the items, and this was the case for our data.

Figure 2 provides a Wright map that illustrates the relationship between persons and items (Wright & Stone, 1979). Persons and items are on the same units on the Wright map, which offers a comparison of items to items and persons to persons as well as persons to items. On the right side of the Wright map, the 13 items are sorted by level of agreement; items that are the most difficult to agree with are at the top of the map and items easiest to agree with are at the bottom. On the left hand side is the distribution of the 288 participants, and they are sorted so that those with higher metarepresentational skills are at the top and those with lower metarepresentational skills are at the bottom. The vertical line shows the interval scale of the logit values. Each hashtag (#) represents 3 persons and a period (.) represents one or two persons. An

Table 3. Results from the Rasch Analysis

ENTRY NUMBER	TOTAL SCORE	MEASURE	MODEL S.E.	INFIT MNSQ	OUTFIT MNSQ	POINT MEASURE CORRELATION
Item5	968	0.80	0.08	0.78	0.79	0.73
Item4	1010	0.52	0.08	0.84	0.79	0.71
Item1	1038	0.32	0.09	0.79	0.90	0.67
Item3	1066	0.12	0.08	0.76	0.76	0.69
Item10	1085	0.01	0.09	0.89	0.82	0.70
Item12	1074	0.07	0.08	1.27	1.24	0.61
Item2	1079	0.03	0.09	1.04	1.01	0.63
Item8	1079	0.03	0.09	1.15	1.20	0.60
Item9	1080	0.02	0.09	0.93	0.91	0.68
Item 11	1114	-0.23	0.09	1.31	1.34	0.59
Item13	1122	-0.29	0.09	1.13	1.11	0.62
Item7	1124	-0.30	0.09	0.88	0.87	0.69
Item 6	1220	-1.09	0.10	1.32	1.21	0.52

"M" represents the mean, "S" is one standard deviation from the mean, and "T" is two standard deviations from the mean.

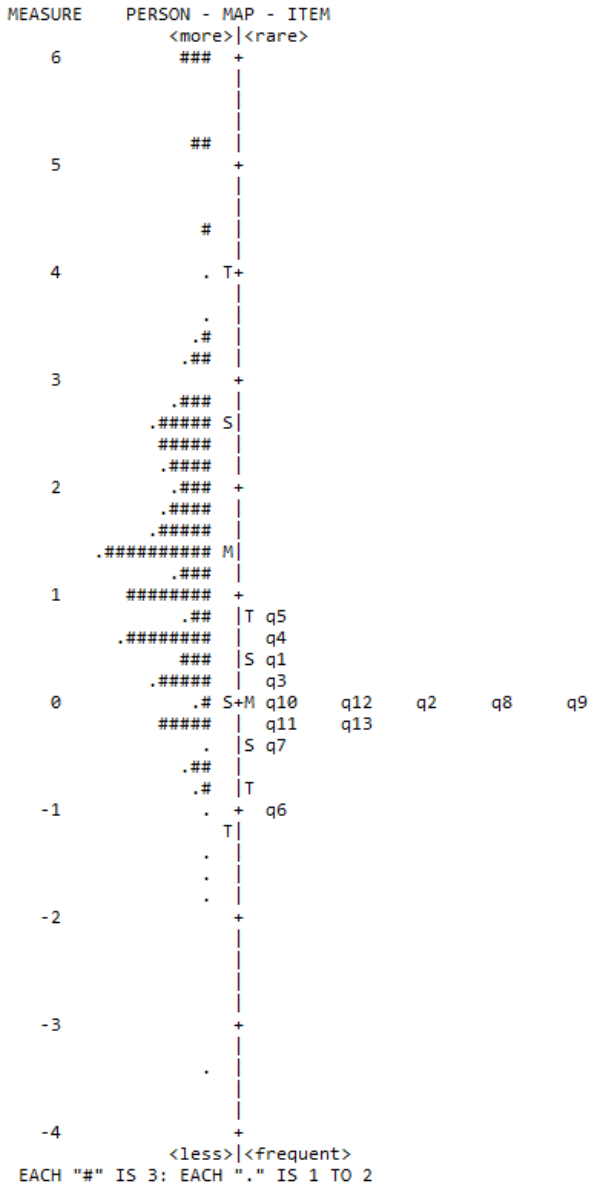

Fig. 2. Wright Map

Survey items that have the same logit value as a person have a 50% probability of being agreed with by that individual. Items that are below a person's logit value have a greater probability of being agreed with (greater than 50%), whereas items above a person's logit value have a lower probability of being agreed with (less than 50%; Boone, Staver, & Yale, 2014).

Our Wright map shows, in general, that people were more agreeable than the items: the M for the participants was slightly higher than the M for the items. Including items that assess more complex metarepresentational skills (for instance, declarative knowledge items are at the top of the Wright map, suggesting those items are most difficult to agree with) may be useful in aligning the means of persons to items. One important note is that the findings from the Wright map correspond with the mean scores for each factor (Table 2). Average scores on the factors tended to be high, indicating that students responded to the survey in a way that suggested that they were highly aware of their use of representations. The students are highly metarepresentational and creating items that assess more complex facets of metarepresentations would be beneficial.

In the Rasch model, reliability is estimated for items and persons (Bond & Fox, 2007). Item reliability provides reliability information of the survey if the same items were administered to a different, but similar sample of individuals. For the MSP, item reliability was 0.96, which is excellent. The person reliability provides reliability information of the instrument if the same group of students were given a different, but similar set of items measuring metarepresentations. The person reliability for the PMI was 0.87, indicating good **reliability**[1]**.** Finally, separation coefficients evaluate whether the items are measuring the underlying concept or just introducing noise (Boone, Staver, & Yale, 2014). Separation coefficients were obtained for both persons (2.59) and items (4.72), and were both considered good levels, suggesting signal to noise ratio is high.

Based on the Rasch analysis, we found good fit statistics, indicating that the items are unidimensional and responses to the survey are consistent with the underlying theoretical construct. The Wright map suggested a solid item to person distribution, but a distribution with higher person scores than item scores.

Students' Beliefs about Free-Body Diagrams

After completing the MSP, students were asked the question "Are free-body diagrams important for physics problem solving? Why or why not?" With the exception of one student, all of the students responded that free-body diagrams are important for physics problem solving. The 288 responses were read and categorized based on themes.

1. The most common explanation for the importance of free body-diagrams was centered around the idea that free-body diagrams are necessary for representing the forces in a problem scenario (n = 157, 55%). Some example responses included:

- Yes they help you isolate the forces acting on an object which can help you make sure you are considering all the necessary components and ignoring things that actually don't have an effect.
- Yes the signs (directions) of objects or forces can be determined by a free-body diagram, and used as a tool to solve physics problem.
- Yes so you can determine what forces act on an object at what angles and in what direction.

2. The second most common explanantion focused on the use of free-body diagrams to organize and/or visualize, in general, information in the problem (n = 96, 33%). Some example responses included:

- Yes. it helps organize the information from the problem.
- Yes because they allow you to visualize the problem and lay out specific pieces.

1 The reliability (internal consistency as measured by traditional Cronbach's alpha) of the 13 items of the MSP was 0.90.

- Yes they are because it gives you an easier way to visualize what is going on in the problem and how to go about it.

3. A few students commented that free-body diagrams help with the understanding and simplification of the problem (n = 3). Some example responses included:

- Yes. I believe they are important because they allow the reader to truly understand the problem and know what they need to solve.
- Yes, it simplifies the problem in one picture.

4. There were a few students who, although they said free body diagrams are important, felt they were not necessarily personally useful (n = 9):

- Never used them before. We were always taught to memorize equations or relationships. but in this case we are supposed to find the equation so I think they are useful if you're going to be an engineer.
- Free body diagrams help me solve the problem, however, setting them up often confuses me, can mess me up, or can take too long.
- I think they are, my peers use them to solve physics problems, I just never learned how to draw them right.

The Link between Students' Free-body Diagrams and Problem Solving Performance

Fifty randomly selected students were asked to solve five mechanics problems for a small amount of extra credit (Table 4). Although we were unable to link students' problem solving to their MSP scores (because of anonymity of the surveys), we wanted to examine the relationship between students free-body diagram use and their problem solving performance. The first of the five problems was designed by Priest and Lindsay (1992) and was used in their physics education research. The other four problems were from a physics final examination for an introductory level physics course that was not a part of this study. The problems were selected to ensure that students had not seen the problems before this exercise.

A physics education researcher scored students' problem solutions (providing partial credit where appropriate). In addition, free-body diagrams for each problem were scored. These diagrams were scored for both quantity (a 1 was given if a diagram was drawn and a 0 was given if there was no diagram drawn for the problem) and quality. Quality of diagrams were determined by comparing students' diagrams to a target sketch that was drawn by a physics instructor and included the necessary components (e.g., angles, forces) needed to have a complete and thorough free-body diagram. For the first problem, a complete sketch included the representation of three forces (normal force, frictional force, and force of gravity broken into its horizontal and vertical components) and one angle, resulting in a total of four components.

In the second problem, a complete free-body diagram included: the change in the vertical distance and the horizontal velocity. In the third problem, a complete diagram included: the velocity of the object both before and after collision. In the fourth problem, a complete free-body diagram included four factors: two forces (the normal force and the force of gravity broken into its horizontal and vertical components), length of the slant, and the angle of the slant. In the fifth problem, a complete free-body diagram included the angle, spring, and length of the compression of the spring, for a total of three factors. For each diagram, students received 1 point for each component drawn, with a range of scores being between 0 and 15 (Taasoobshirazi & Carr, 2009).

SAS 9.4 was used to examine the correlations between students' scores on the five problems, if a diagram was drawn (yes/no), and diagram quality. Students' scores on the five problems ($M = 2.33$, $SD = 1.50$) was negatively, but not significantly correlated with whether a diagram was drawn ($M = 4.04$, $SD = 1.12$), $r = -.12$, $p = .37$. Scores on the five problems were also negatively, but not significantly correlated with diagram quality ($M = 10.08$, $SD = 3.27$), $r = -.15$, $p = .30$). Only diagram quality was significantly correlated with drawing a diagram, $r = .85$, $p < .001$. There was not a significant correlation between drawing a diagram or quality of diagram and correctly solving the problems.

This finding was not surprising to us. Students are drawing diagrams, but their diagram use is not linked to their performance. After each problem, we asked students "Did you draw a free-body diagram?" If yes, did you use it to solve the problem?" Ninety-four of the 202 times students drew a

Table 4. Physics Problems

A block of mass 7 kg starts sliding down a plane of length 5 m, inclined at an angle of 30 degrees to the horizontal. If the coefficient of friction between the block and the plane is 0.2, find the velocity (vt) of the block when it reaches the bottom of the plane.
An airplane flies horizontally with a speed of 300 m/s at an altitude of 400 m. Assume that the ground is level. What horizontal distance from a target must the pilot release a bomb so as to hit the target?
A 0.15 kg steel ball is dropped onto a steel plate where its speed just before impact and after impact is 4.5 m/s and 4.2 m/s, respectively. If the ball is in contact with the plate for .03 seconds, what is the magnitude of the average force (in N) applied by the plate on the ball?
An escalator is 30.0 meters long and slants 30 degrees relative to the horizontal. If it moves at 1.00 m/s, at what rate does it do work in lifting a 50.0 kg man from the bottom to the top of the escalator?
A 1.0 kg block is released from rest at the top of a frictionless incline that makes an angle of 37 degrees with the horizontal. An unknown distance down the incline from the point of release, there is a spring with k = 200 N/m. It is observed that the mass is brought momentarily to rest after compressing the spring 0.20 m. What distance does the mass slide from the point of release until it is brought momentarily to rest?

diagram, students stated that the diagram was not used to solve the problem. This means that students are responding on the MSP that they understand and can monitor their free-body diagram use (please note the averages in Table 2), are in general drawing diagrams 202 diagrams for 250 problems = 81% of the time. However, they are not using the diagrams 47% of the time. The questions is why? If students know that diagrams are important and are drawing them, why are they not using them to solve problems? Are students who say they are using the diagrams more likely to answer questions correctly than those saying they are not using them?

To help answer this last quesion, 50 problems with a free-body diagram drawn were randomly selected and the correlation between score on the problem (correct/incorrect) and whether a diagram was used to solve the problem (yes/no) was calculated. The correlation phi = .12, p = .94. There was not a significant correlation between self-reported use of a diagram and correctly solving the problems.

There is the perspective that a free-body diagram should only include the body of interest and the external forces acting on it. This is because the purpose of the diagram is to determine the magnitude, direction, and point of application of external forces. For this reason, we randomly selected 50 packets and only scored the two problems (problems 1 and 4) that required forces to be included in the free-body diagrams. We tested the correlations between students' scores on the two problems, if a diagram was drawn for each problem, whether the diagram was used, and diagram quality (five points total for the five forces involved in the two problems). Students' scores on the two problems (M = 0.94, SD = .80) was not significantly correlated with drawing a diagram (M = 1.92, SD = .34), r = .13, p = .36, or diagram quality (M = 3.74, SD = 1.50), r = -.03, p = .83. Students' scores on the problems were also not correlated with their self-reported use of the free-body diagrams (M = 1.32, SD = .68), r = -.13, p = .36. One interesting finding was that drawing a diagram and diagram quality were both significantly correlated with self-reported use of the diagrams, r = .38, p = .007 and r = .50, p <. 001, respectively. Diagram quality was significantly correlated with diagram use, r = .52, p < .001. Therefore, although the relationship between diagrams and successful problem solving was absent, when forces were the focus of the drawings, there was a link between students' self-reported use of diagrams and diagram presence and quality. This may be because forces are a primary focus of the equations that the students set up to solve after drawing the diagram. However, the next important step or connection between diagram use and problem solving accuracy is missing.

Tony Wayne, a high school physics instructor, has created a website teaching students why and how to use free-body diagrams (Wayne, 2020). He explains that the diagram is a starting point for developing a mathematical model of the forces acting on an object. If the mathematical model is the set of equations, then students who draw diagrams and draw more thorough diagrams should have increased problem solving accuracy. This was not the case for the students in present study or for students in the research that we reviewed. If free-body diagrams allow for improved understanding of the problem scenario, this should also translate to improved problem solving. This was not the case and, as discussed in the introduction of the paper, Taasoobshirazi and Carr (2009) did not find a link between diagram use and conceptual understanding of physics.

We present the questions: how are students using free-body diagrams? How should free-body diagrams be used and their effectiveness comprehensively measured? Are free-body diagrams changing the way students are writing their equations (such as changing the sign of the forces in the equations)? For instance, if a student represents a force incorrectly in their diagram and, in turn, their equations, this would lead to an incorrect solution. If students are drawing the diagrams with correct forces and are using those diagrams, could the disconnect between diagram use and problem solving accuracy be due to a third variable such as strategy use? Is there something to the effort of drawing the diagram itself? As an example, your instructor may allow you to make a note card to use during a test and a lot of energy is devoted to putting information on the card, but because you created the card, you did not actually need to use it during the test. Does this mean that students who draw the diagrams don't need to use them? Although we reviewed numerous tutorials that emphasize the importance of drawing a thorough free-body, none answered the question about how they should be used after they are drawn.

Discussion

The goal of this study was to develop and validate an instrument designed to evaluate students' metarepresentational skills in physics. A confirmatory factor analysis and Rasch analysis attested to the construct validity of the scale and its alignment to theory. The MSP is a brief, objective, valid, and reliable way to assess and understand students' metarepresentational skills. We recommend its use in physics classrooms and programs and for science education research. Additionally, we suggest that the MSP can be used to evaluate students' metarepresentational skills in other sciences, such as organic chemistry, where molecular diagrams play an essential role in problem solving. In such a case, the word chemistry can be substituted for the word physics.

Given the extensive emphasis on the use of free-body diagrams in physics and the disconnect between students' use of these diagrams and their performance, we felt it was important to be able to assess students' understanding and regulation of their diagram use. The evaluation of metarepresentational skills is a necessary requisite for studies of free-body diagram use and potential intervention studies. The present study adds to the discussion of free-body diagram use in physics and presents a clear need for additional and current work on how students are using free-body diagrams, an assessment of the relationships between free-body diagram use and educational outcomes in physics, and the need to explain the disconnect between free-body diagram use and successful problem solving for introductory level physics. The MSP will be instrumental in this vital research.

As with all research, there were limitations in the current study, one of which is that our findings are restricted to introductory level, calculus-based physics students. At present, there is insufficient data to inform us about free-body diagram use and metarepresentational skills among intermediate and upper level physics students. A second limitation was that this study, as well as the studies that were reviewed in the

introduction of the paper, were all cross-sectional evaluations of diagram use. Administering the MSP to varying levels of physics students and at different times during their program of study of physics would help determine growth and change. Conditional, structural equation, and nested growth models can answer questions about mediating and moderating effects of related variables over time. A third limitation was our inability to link the students' diagrams and problems from the packets with their MSP responses. We weren't able to connect student work on the problems to the survey responses due to anonymity reasons. However, we recommend that researchers conduct more mixed methods research on this topic with a focus on, in what ways students solve problems and how they use free-body diagrams support their problem solving and how this relates to metarepresentations. Finally, there is a need for more qualitative research on the topic. Using think aloud protocols to explore how students use free-body diagrams would allow for a more detailed descriptions of this process as it related to metarepresentation in physics education.

Conflict of interest

The authors declare no conflict of interest.

References

Supeno, S., Subiki, S., & Rohma, L. W. (2018). *Students' Ability in Solving Physics Problems on Newtons' Law of Motion*. http://repository.unej.ac.id/handle/123456789/92723

Kohl, P. B., & Finkelstein, N. D. (2006). Effects of representation on students solving physics problems: A fine-grained characterization. *Physical review special topics-Physics education research, 2*(1), 010106. https://doi.org/10.1103/PhysRevSTPER.2.010106

diSessa, A. A. (2004). Metarepresentation: Native competence and targets for instruction. *Cognition and instruction, 22*(3), 293-331. https://doi.org/10.1207/s1532690xci2203_2

Rosengrant, D., Van Heuvelen, A., & Etkina, E. (2009). Do students use and understand free-body diagrams? *Physical Review Special Topics-Physics Education Research, 5*(1), 010108. https://doi.org/10.1103/PhysRevSTPER.5.010108

Taasoobshirazi, G., & Carr, M. (2009). A structural equation model of expertise in college physics. *Journal of Educational Psychology, 101*(3), 630. https://doi.org/10.1037/a0014557

Van Heuvelen, A., & Zou, X. (2001). Multiple representations of work–energy processes. *American Journal of Physics, 69*(2), 184-194. https://doi.org/10.1119/1.1286662

Sherin, B. L. (2000). Meta-representation: An introduction. *The Journal of Mathematical Behavior, 19*(4), 385-398. https://doi.org/10.1016/S0732-3123(01)00051-7

Taasoobshirazi, G., Bailey, M., & Farley, J. (2015). Physics metacognition inventory part II: confirmatory factor analysis and rasch analysis. *International Journal of Science Education, 37*(17), 2769-2786. https://doi.org/10.1080/09500693.2015.1104425

Flavell, J. H. (1985). *Cognitive development (Second Edition)*. Englewood Cliffs, NJ: Prentice Hall.

Dinsmore, D. L., Alexander, P. A., & Loughlin, S. M. (2008). Focusing the conceptual lens on metacognition, self-regulation, and self-regulated learning. *Educational Psychology Review, 20*(4), 391-409. https://doi.org/10.1007/s10648-008-9083-6

Schraw, G. (2001). *Promoting general metacognitive awareness. In Metacognition in learning and instruction* (pp. 3-16). Springer, Dordrecht. https://doi.org/10.1007/978-94-017-2243-8_1

Veenman, M. V. (2007). The assessment and instruction of self-regulation in computer-based environments: a discussion. *Metacognition and Learning, 2*(2-3), 177-183. https://doi.org/10.1007/s11409-007-9017-6

Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in science education, 36*(1-2), 111-139. https://doi.org/10.1007/s11165-005-3917-8

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology, 19*(4), 460-475. https://doi.org/10.1006/ceps.1994.1033

Pett, M. A., Lackey, N. R., & Sullivan, J. J. (2003). *Making sense of factor analysis: The use of factor analysis for instrument development in health care research. sage.*

Browne, M. W., & Cudeck, R. (1993). *Alternative ways of assessing model fit In Bollen KA, Long JS, editors. Testing structural equation models.* Beverly Hills, CA: Sage, 111-135.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal, 6*(1), 1-55. https://doi.org/10.1080/10705519909540118

Kline, R. B. (2016). *Methodology in the social sciences. Principles and practice of structural equation modeling* (4th ed.): Guildford Press.

Lim, S. M., Rodger, S., & Brown, T. (2009). Using Rasch analysis to establish the construct validity of rehabilitation assessment tools. *International Journal of Therapy & Rehabilitation, 16*(5), 251–260. https://doi.org/10.12968/ijtr.2009.16.5.42102

Boone, W. J., Townsend, J. S., & Staver, J. (2011). Using Rasch theory to guide the practice of survey development and survey data analysis in science education and to inform science reform efforts: An exemplar utilizing STEBI self-efficacy data. *Science Education, 95*(2), 258-280. https://doi.org/10.1002/sce.20413

Baghaei, P. (2008). The Rasch model as a construct validation tool. *Rasch Measurement Transactions, 22*(1), 1145-1146.

Linacre, J. M. (2012). *A user's guide to WINSTEPS MINISTEP. Rasch model computer programs.* Beaverton, Oregon: Winsteps. com.

Wright, B. D., & Stone, M. H. (1979). *Best test design*.

Boone, W. J., Staver, J. R., & Yale, M. S. (2013). *Rasch analysis in the human sciences.* Springer Science & Business Media.

Bond, T. G., & Fox, C. M. (2007). *Applying the Rasch model: Fundamental measurement in the human sciences.* Mahwah, NJ: Psychology Press.

Priest, A. G., & Lindsay, R. O. (1992). New light on novice—expert differences in physics problem-solving. *British Journal of Psychology, 83*(3), 389-405. https://doi.org/10.1111/j.2044-8295.1992.tb02449.x

Wayne, T. (2020). *Free body diagrams: the basics.* http://www.mrwaynesclass.com/freebodies/reading/index01.html

РОЗУМІННЯ ПОБУДОВАНИХ СТУДЕНТАМИ СИЛОВИХ СХЕМ ВІЛЬНОГО ТІЛА З ВИКОРИСТАННЯМ ОПИТУВАННЯ З МЕТАРЕПРЕЗЕНТАЦІЙ ДЛЯ ФІЗИКИ

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Реферат. Стаття: 9 с., 4 табл., 1 рис., 27 джерел.

Мета дослідження. Опитування з метарепрезентацій для фізики (ОМФ) було розроблене для оцінки метарепрезентаційних знань студентів під час розв'язування фізичних задач.

Матеріали та методи. Опитування проводили серед 288 студентів-фізиків коледжу початкового рівня. Психометричні властивості цього засобу вимірювання, включаючи валідність конструкта, оцінювали за допомогою підтверджувального факторного аналізу та метричного аналізу на основі моделі Раша.

Результати. Ми також вивчали уявлення студентів щодо використання силових схем вільного тіла та ретельно вивчали зв'язок між успішністю студентів у розв'язанні задач і побудованими ними силовими схемами вільного тіла.

Висновки. Ми рекомендуємо використання ОМФ викладачам фізики та науково-педагогічним дослідникам, які бажають оцінити побудовані студентами силові схеми вільного тіла. Крім того, ми припускаємо, що для оцінки метарепрезентацій в інших галузях знань предмет фізики можна замінити на хімію, генетику або на іншу дисципліну.

Ключові слова: метарепрезентації, силові схеми вільного тіла, валідність конструкта, моделювання структурними рівняннями, моделювання даних за логістичною моделлю Раша.

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ORIGINAL SCIENTIFIC ARTICLE

ENHANCING STUDENTS' WELL-BEING: DO GENDER AND INTERPERSONAL COMMUNICATION MATTER?

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

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Abstract

Study purpose. Building social interactions is challenging due to difficulties in communicating clearly and adjusting to new learning systems. Because of the Covid-19 pandemic, there is a significant difficulty with this. There is a need to promote student well-being because of this unfavorable situation, which undoubtedly makes it harder to achieve. This research aimed to study the effect of interpersonal communication on students' well-being in view of their gender in students in grades X and XI at Madrasah Aliyah Negeri 2 Banyumas, Indonesia, during learning in the pandemic period.

Materials and methods. This study used the quantitative method by testing simple linear regression and t-test. The study sample comprised a total of 265 students selected using the method of proportionate stratified random sampling. The instruments in this research used the scale of student well-being with reliability of (α Cronbach = 0.835), and the scale of interpersonal communication with reliability of (α Cronbach = 0.761).

Results. The results of this study showed that 1) interpersonal communication has an effect of 20.1% on the variation of students' well-being; 2) students' well-being for male and female students was not significantly different. The interpersonal communication between male and female students, however, differed significantly.

Conclusions. Therefore, according to this research, it is essential to practice the skill of interpersonal communication in order to be able to improve students' well-being.

Keywords: interpersonal communication, students' well-being, students.

Introduction

Education is necessary for every individual; through education, the next generation is expected to be competitive individuals. School is a crucial means for individuals to develop and prepare themselves to be the competitive generation. Therefore, school is expected to create a good learning environment for students and help students in achieving well-being in school. As it should be, an individual needs well-being that is received through a meaningful life.

The issue that often arises in the scope of school is the difficulty in achieving the students' well-being in school. It is proved by research conducted by Na'imah (2010), who stated various problems with students' attitudes, such as students who do not like to mingle with other groups of students who have a higher economic status, tends to hard to accept defeat, often feel shy, jealous, and showing inappropriate attitudes. To add, the research that was conducted by Josef and Hidayat (as cited in Wati & Leonardi, 2016) by examining 1,200 students in Indonesia found that 4.6% of students were very dissatisfied with school, 65% of students experienced mental health and psychosocial problems at a moderate level, and 12% of students had physically attacked by other students. According to Petegem et al., (2008), students with a low well-being level tend to do negative, harmful, and anti-school attitudes. The importance of students' well-being improvement in school obligates the teachers and students' contemporaries in the school environment to care about the circumstance or condition of students so that the experiences in school will be fun for students.

The learning activity that is initially carried out face-to-face, during the pandemic of Covid-19 that spread in almost all countries in the world brings a change in the field of education. The government regulates a policy of Large-Scale Social Restrictions (PSBB) to reduce the spread of Covid-19, and one of the effects of the policy is that the online learning activity process must be implemented. The learning process that must be carried out online changes the social interaction pattern between students and their contemporaries. The intensity of face-to-face interaction between students and their contemporaries keeps reducing, and they only interact online. Kusuma and Sutapa (2021) stated that during the pandemic of Covid-19, students did not meet their contemporaries in school, which

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resulted in students experiencing low socialization with their contemporaries. In addition, concerning the issue that the students feel which can lead to the lack of students' interpersonal relationships and students' well-being achievement in school, the researcher assumed that interpersonal communication is an essential ability for students in order to be able to solve problems that are faced by asking opinion or sharing story with people. It is expected that it can improve the students' well-being.

Moreover, studies on student well-being have been extensively researched, but it is widely researched with qualitative approaches, including studies conducted by Thoybah and Aulia (2020), Fraillon (2004), Setyahadi and Yanuviati (2017), also Wati and Leonardi (2016). Nevertheless, in this study, the researcher intends to conduct the research using quantitative methods. Furthermore, no studies have examined the effect of interpersonal communication on student well-being viewed from gender. Thus, this research aims to study the effect of interpersonal communication on student well-being; also gender differences in these two variables in grades X and XI at Madrasah Aliyah Negeri 2 Banyumas, Indonesia, during learning in the pandemic period.

Literature Review

Student Well-Being

The study of the psychological well-being theory by Ryff and Keyes (1995) in the school context led to the development of the student well-being theory. According to Soutter et al. (2014), student well-being is based on various dimensions that exist when one interacts with others, the environment, and the development of life, particularly in the educational context. Thus, it can be inferred that student well-being is a condition of individuals who show satisfaction with their learning experience at school and a positive relationship with their contemporaries and teachers.

Student well-being is divided into four dimensions (Na'imah & Tanireja, 2017), as described as follows: 1) Social, good social relationships with teachers and contemporaries are essential for improving students' well-being. Social relationships cannot be excluded from the individual's basic needs and are essential for the individual's well-being; 2) Cognitive, refers to a feeling of competence in the individual. To improve his or her sense of competence, an individual needs to be guided to have a pleasant experience in the social environment as well as class learning; 3) Emotions, profoundly affect the level of well-being of the individual in school. Positive emotion can help to increase and reach the student's well-being while the negative emotions may decrease or hinder the achievement of the student's well-being; 4) Spiritual, experiences felt due to good practice of religious teaching and strong belief will result in a feeling of well-being within the individual.

Furthermore, Pollard & Lee (2003) divining student well-being into five dimensions, as described as follows: 1) Physical well-being, is the capability to uphold a healthy level of life that enables us to fully participate in everyday activities without experiencing excessive physical stress or tiredness (Australian National University, 2020); 2) Economic well-being, refers to an individual's capacity to meet their requirements for both goods and services (OECD, 2013); 3) Psychological well-being, is generally considered as a combination of well-being in one's personal and social life and some pleasurable affective experiences (Deci & Ryan, 2008); 4) Cognitive well-being, refers to how individuals perceive both their overall life happiness and individual life domains (Luhmann, 2017); 5) Social well-being, described as an individual's evaluations of their interpersonal relationships, situations, and performances in social communities (Dunaeva, 2018).

Interpersonal Communication

Interpersonal communication is the exchange of information between two people with a clear relationship (DeVito, 1995). In the book "Introduction to Communication," interpersonal communication is defined as communication between two people with a strong and transparent relationship (Wiryanto, 2004). Thus, it can be inferred that interpersonal communication is a process of communication between individuals conducted face-to-face, and there is a clear relationship between them.

Interpersonal communication is divided into five aspects (Bienvenu, 1971), as described in the following: 1) Self Concept, an individual's perception of themself, may it be skill or ability, and physical presentation (Ranny et al., 2017). Self-concepts are critical to influencing an individual's communication with others (Bienvenu, 1971); 2) Ability, is an individual's to become a good listener. To this day, the ability to be a good listener has received little attention; 3) the Skill of Expressing, is a skill to express thoughts and ideas clearly, which many people still find difficult to do; 4) Emotion, refers to an individual's ability to overcome their emotions, especially negative emotions, and to be able to express them positively; 5) Self Disclosure, refers to how an individual's willingness to express themself frankly and freely to establish interpersonal relationships.

Materials and methods

Study Participants

Participants in this study were students grades X and XI of Madrasah Aliyah Negeri 2 Banyumas, Indonesia. Participants consisted of 195 female and 70 male students aged 15-19 years old. The demographic data are shown in table 1.

Table 1. Demographic Data

No.	Criteria	N	%
1.	Gender		
	Male	70	26%
	Female	195	74%
2.	Age		
	15 years old	32	12%
	16 years old	160	60%
	17 years old	67	25%
	18 years old	4	2%
	19 years old	2	1%
3.	Grades		
	X	123	46%
	XI	142	54%
4.	Residence Status		
	With parents	232	88%
	With relatives	11	4%
	By themselves	8	3%
	Others	13	5%

Measurement

Student Well-Being

Student Well-Being is measured by the Student Well-Being scale using the aspect from Na'imah & Tanireja (2017), which consists of 26 items including social, cognitive, emotional, and spiritual aspects. The reliability test uses Cronbach's Coefficient Alpha which produces a score of 0.835. This study used a Likert scale with five alternative answers, "strongly agree," "agree," "neutral," "disagree," and "strongly disagree."

Interpersonal Communication

Interpersonal communication is measured by the Interpersonal Communication scale using the aspect from Bienvenu (1971), which consists of 21 items including self-concept, ability, skill of expressing, emotion, and self-disclosure aspects. The reliability test uses Cronbach's Coefficient Alpha which produces a score of 0.761. This study used a Likert scale with five alternative answers, "strongly agree," "agree," "neutral," "disagree," and "strongly disagree."

Data Analysis

This study used a descriptive analysis method to determine the level of interpersonal communication and student well-being. The effect of interpersonal communication on student well-being was thus tested in this study using simple regression analysis techniques and t-tests. It also compared the average of interpersonal communication and student well-being between two variants, specifically gender, using the Statistical Package for the Social Science (SPSS) 26.0 program for Windows.

Result

Descriptive Analysis

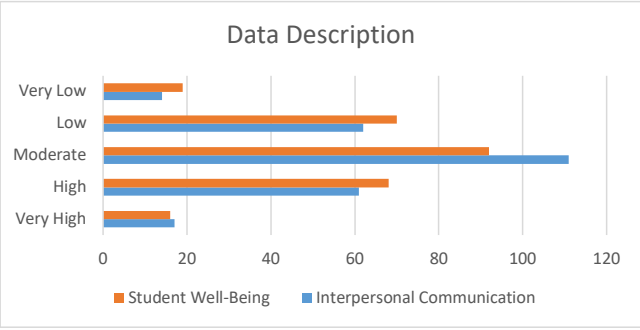

Fig. 1. Data Description

Student Well-Being

Based on the results of the survey, it can be compiled the following characteristic of the subject: 16 subjects (6.0%) had a very high level of student well-being, 68 subjects (25,7%) had a relatively high level of student well-being, 92 subjects (34,7%) had a moderate level of student well-being, 70 subjects (26.4%) had a low level of student well-being, and 19 subjects (7.2%) had a very low level of student well-being.

Interpersonal Communication

Based on the results of the survey, it can be compiled the following characteristic of the subject: 17 subjects (6,4%) had a very high level of interpersonal communication, 61 subjects (23%) had a relatively high level of interpersonal communication, 111 subjects (41,9%) had a moderate level of interpersonal communication, 62 subjects (23,4%) had a low level of interpersonal communication, and 14 subjects (5,3%) had a very low level of interpersonal communication.

Assumption Test

Normality Test

The normality test was performed with the Statistical Package for the Social Science (SPSS) 26.0 program for Windows. It used the One-Sample Kolmogorov-Smirnov Test to test the normality of spread scores. The results of the normality test are shown in table 2. below:

Table 2. Normality Test Result

X	Y	p	Annotation
Interpersonal Communication	Student Well-Being	0.200	Normal

Based on the Normality test, it is shown that the collected data have been qualified for analysis. The Interpersonal Communication and Student Well-Being variable has a significant value of 0.200 ($p > 0.05$); therefore, it can be inferred that distributed data are normal.

Linearity Test

The assumption test of linearity was performed with the Statistical Package for the Social Science (SPSS) 26.0 program with a significant test for linearity of 0.05. The results of the linearity test are said to be linear if it has a significant value (linearity) smaller than 0.05 ($p < 0.05$) (Sugiyono, 2013). The results of the linearity test are shown in table 3. below:

Table 3. Linearity Test Result

X	Y	p	Annotation
Interpersonal Communication	Student Well-Being	0.000	Linear

According to table 3, the result of the assumption test of linearity showed that the significance level is 0,000 ($p < 0,05$), which means that in this research, there is a linear relationship between interpersonal communication and student well-being.

Hypothesis Test

The Effect of Interpersonal Communication on Student Well-Being

The researcher intended to know the effect of interpersonal communication on student well-being. The results of the regression test are shown in table 4. below:

Table 4. Regression Test Result

X	Y	F	p	R Square
Interpersonal Communication	Student Well-Being	66.055	0.000	0.201

Based on the regression test results, the effect of interpersonal communication on student well-being with 5% significance found that the F Count Value = 66,055 and the significant probability was sig. (p) 0,000. As a result, interpersonal communication has a significant effect on student well-being. Furthermore, based on the result of Rsquare's coefficient of determination = 0.201, the interpersonal communication variable has an effect of 20.1% on the variation of students' well-being. Moreover, the student well-being variable was affected by other factors of 79.9% that were not studied in this study, which are the relation between teacher and student (Lavy & Naama-Ghanayim, 2020), relation between children and parents (Bireda & Pillay, 2018), contemporaries relation (Moore et al., 2018), and an environment that supports discipline (Harding et al., 2019).

T-Test: Independent Samples Test Student Well-Being

Researchers intended to analyze whether students' well-being differs by gender in male and female students. The results of the analysis conducted to find out the differences in student well-being by gender are shown in table 5. below:

Table 5. Independent Samples Test Result

Variable	Gender	N	Mean	sig
Student Well-Being	Male	70	94.39	0.111
	Female	195	97.26	

The significance score of 0.111 ($p > 0.05$) indicates no significant difference between the well-being of male and female students. In terms of the average score (mean), the well-being of female students has a higher score, but on a test-by-test basis, the difference is insignificant.

Interpersonal Communication

Researchers intended to analyze whether students' interpersonal communication differs by gender in male and female students. The results of the analysis conducted to find out the differences in interpersonal communication by gender are shown in table 6. below:

Table 6. Independent Samples Test Result

Variable	Gender	N	Mean	sig
Interpersonal Communication	Male	70	73.99	0.011
	Female	195	77.56	

The significance score of 0.011 ($p < 0.05$) indicates a significant difference between the interpersonal communication of male and female students. In terms of the average score (mean), the interpersonal communication of female students has a higher score, but on a test-by-test basis, the difference is significant.

Discussion

The results of this study showed a significant effect of interpersonal communication variables on student well-being. It is based on the hypothesis test. Based on the regression analysis results between interpersonal communication variables and student well-being, it is known that the significance score is 0.000 ($p < 0.05$), so it can be inferred that the hypothesis is accepted that there is a significant effect of interpersonal communication on student well-being. This study also showed a coefficient of determination of 0.201, which means interpersonal communication effectively affects 20.1% of students' well-being. This showed that the better interpersonal communication, the higher the student's well-being; the weaker the interpersonal communication, the lower the student's well-being.

Based on the existing statistical data, the students of Madrasah Aliyah Negeri 2 Banyumas, Indonesia, had a relatively low level of interpersonal communication. The reality in the field shows that some of the students of Madrasah Aliyah Negeri 2 Banyumas, Indonesia, have a fairly low level of interpersonal communication because the most scores exist at the moderate and low levels of 41.9% and 23.4%, respectively, due to the pandemic situation in which the subjects have not been able to adjust to the communication pattern. This positively affected the student well-being held by the students of Madrasah Aliyah Negeri 2 Banyumas, Indonesia, because the student well-being level in Madrasah Aliyah Negeri 2 Banyumas, Indonesia, is also relatively low because most scores are at moderate and low levels of 34.7% and 26.4% respectively. This condition indicates that the better interpersonal communication, the higher the student's well-being; the weaker the interpersonal communication, the lower the student's well-being.

The researcher saw that most of the students from Madrasah Aliyah Negeri 2 Banyumas, Indonesia, had relatively low interpersonal communication because, for about two years, the school conducted a long-distance learning program. Hence, the pattern of social interaction between the students with teachers and friends at school changed. The intensity of face-to-face interpersonal communication is decreasing and hinders good social relationships for students. In line with research conducted by Yusuf and Setiawan (2022) with the same subject characteristics as the high school students, the frequency of interpersonal communication decreased during long-distance learning, as well as the dominant indirect interaction patterns and limited interaction directly influence the quality of the social relations development process for subjects in the study.

Based on the interviews that the researchers conducted with counseling teachers, there was information that communication between the students was relatively low, so the resolution of the problems experienced by the students was still not optimal. This implies that the well-being of students in schools is still not achieved due to the problems felt and unpleasant experiences experienced by students in school and learning environments. Based on these unfavorable conditions, an effort to improve student well-being is needed. Cahyono et al. (2021) also stated that students who achieve well-being have a feeling of comfort in school, there is self-acceptance, good relationship with others, no negative

conditions are felt, and students can engage in the school community.

Therefore, students who have low interpersonal communication will hinder the achievement of student well-being. This makes interpersonal communication with teachers and their contemporaries at school to be optimized so that students can overcome the problems or negative conditions felt at school and work towards a good social relationship with teachers and contemporaries; and to be expected that this is an effort that is right to improve student well-being. To add, Na'imah and Tanireja (2017) stated that good social relationships with teachers and contemporaries are indispensable for improving students' well-being. Social relationships cannot be excluded from the individual's basic needs and are essential for the individual's well-being.

In addition, Interpersonal communication with contemporaries and social community allows subjects to learn mutual relationships, get to know others and themselves, and understand social interests and perceptions, making it easier for subjects to adapt to their contemporaries and social activities. The ease with which a student adapts to contemporaries and social activities is predicted to improve student well-being in school because the student can socialize and engage in interpersonal communication with their contemporaries in school and social community.

Furthermore, this study explained that there is no significant difference between male and female students' well-being, although the average (mean) of female students is higher than male students. This can be seen in a significance score of 0.111 ($p > 0.05$), indicating no differences in student well-being between male and female students. In line with research conducted by Løhre et al., (2014) which showed that no gender differences were revealed in evaluating student well-being in schools. The results of data analysis show that male participants tend to have higher well-being when getting academic assistance from teachers compared to other students; meanwhile female students feel loneliness, that correlates strongly and negatively with students' well-being (Løhre et al., 2014).

This study also explained that there was a significant difference in interpersonal communication in male and female students, as it looked at the significance score of 0.011 ($p < 0.05$), which showed that there is a significant difference on interpersonal communication in male and female students in Madrasah Aliyah Negeri 2 Banyumas, Indonesia. This is in line with Gray's statement (as cited in Juliano, 2015) that men and women are indeed different, and the essential aspect of communicating is the sense of consciousness. Men are thought to have a feeling of self-awareness through the ability to receive results, while women's sense of awareness is interpreted through feelings and the quality of relationships. Juliano (2015) further argues that the difference in communication between men and women is a shared secret.

To add, the limitations of this study were only students from grades X and XI, and only one school was involved. The researcher believes that the small number of subjects in this study only describes a small part of the student population. Therefore, the researcher suggests further research conducting research not only in grades X and XI but also in grades that still belong to the adolescence category; and conducting research in a broader area. Moreover, this study implies that it is expected that students will be able to support their contemporaries to build good social relationships and can be involved in the school community. Therefore, the development of knowledge about well-being is also felt necessary for children and adolescents, as we all know that the well-being of the individual as a teenager will affect the next period of development (Jannah, 2017).

Conclusion

Based on the result and discussion about interpersonal communication on student well-being viewed from gender at Madrasah Aliyah Negeri 2 Banyumas, Indonesia, this study concludes that interpersonal communication significantly affects student well-being. According to gender, there is no significant difference between student well-being in both male and female students. However, there are significant differences in interpersonal communication between male and female students. Furthermore, the advice for education institutions is that they are expected to pay attention to the fulfillment of students' well-being and to provide interventions to develop interpersonal communication skills to improve student well-being in grades X and XI Madrasah Aliyah Negeri 2 Banyumas, Indonesia. In addition, the results of this study are expected to contribute to further research by providing a deeper understanding and can be utilized as a reference.

Conflict of interest

The authors declare no conflict of interest.

References

Na'imah, T. (2010). Studi Tentang Strategi Wanita Dalam Pengembangan Karakter Anak Dari Keluarga Miskin Di Purwokerto Selatan. *Psycho Idea, 8*(1)(0281), 53-71.

Wati, K. D., & Leonardi, T. (2016). Perbedaan Student Well-Being Ditinjau dari Persepsi Siswa terhadap Perilaku Internasional Guru. *Jurnal Psikologi Pendidikan Dan Perkembangan, 5*(1), 1-10.

Petegem, K. Van, Creemers, B., Aelterman, A., & Rosseel, Y. (2008). The importance of pre-measurements of wellbeing and achievement for students' current wellbeing. *South African Journal of Education, 28*(4), 451-468. https://doi.org/10.15700/saje.v28n4a131

Kusuma, W. S., & Sutapa, P. (2021). Dampak Pembelajaran Daring terhadap Perilaku Sosial Emosional Anak. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini, 5*(2), 1635-1643. https://doi.org/10.31004/obsesi.v5i2.940

Thoybah, N., & Aulia, F. (2020). Determinan Kesejahteraan Siswa Di Indonesia (Sebuah Tinjauan Literatur). *Jurnal Riset Psikologi, 20*(2).

Fraillon, J. (2004). Measuring Student Well-Being in the Context of Australian Schooling: Discussion Paper. *The Australian Council for Educational Research,* December, 1–54. http://www.mceetya.edu.au/verve/_resources/Measuring_Student_Well-Being_in_the_Context_of_Australian_Schooling.pdf

Setyahadi, S. Y., & Yanuviati, M. (2017). Studi Deskriptif Mengenai Student Well-Being pada Siswa SMA X Bandung. *Prosiding Psikologi, 4*(1), 32–37.

Ryff, C. D., & Keyes, C. L. M. (1995). The Structure of Psychological Well-Being Revisited. *Journal of Personality and Social Psychology, 69*(4), 719-727. https://doi.org/10.1037/0022-3514.69.4.719

Soutter, A. K., O'Steen, B., & Gilmore, A. (2014). The student well-being model: A conceptual framework for the development of student well-being indicators. *International Journal of Adolescence and Youth, 19*(4), 496-520. https://doi.org/10.1080/02673843.2012.754362

Na'imah, T., & Tanireja, T. (2017). Student Wellbeing pada Remaja Jawa. *Psikohumaniora: Jurnal Penelitian Psikologi, 2*(1), 1-11.

Pollard, E. L., & Lee, P. D. (2003). Child well-being: a systematic review of the literature. *Social Indicators Research, 61*(1), 59-78. https://doi.org/https://doi.org/10.1023/A:1021284215801

Australian National University. (2020). *Physical Wellbeing.* Retrieved from https://www.anu.edu.au/covid-19-advice/health-wellbeing/strategies-for-wellbeing-at-home-or-on-campus/physical-wellbeing

OECD (2013). *Economic well-being*. 25-39. Retrieved from https://www.oecd-ilibrary.org/docserver/9789264194830-5-en.pdf?expires=1659200388&id=id&accname=guest&checksum=91FEF0589E758C84F57AA5D2AA20DDE6

Deci, E. L., & Ryan, R. M. (2008). Hedonia, Eudaimonia, and Well-Being: an Introduction. *Journal of Happiness Studies, 9*(1), 1-11. https://doi.org/10.1007/s10902-006-9018-1

Luhmann, M. (2017). The development of subjective well-being. *Personality Development Across the Lifespan, Academic Press,* 197-218. https://doi.org/10.1016/B978-0-12-804674-6.00013-2

Dunaeva, V. (2018). New Approaches in Social Well-Being Studies. *PEOPLE: International Journal of Social Sciences, 4*(3), 566-573. https://doi.org/10.20319/pijss.2018.43.566573

DeVito, & A, J. (1995). *The Interpersonal Communication Book* (Seventh Edi). Harper Collins College Publishers.

Wiryanto (2004). *Pengantar Ilmu Komunikasi*. PT. Grasindo.

Bienvenu, M. J. (1971). An Interpersonal Communication Inventory. *Journal of Communication, 21*(4), 381-388. https://doi.org/10.1111/j.1460-2466.1971.tb02937.x

Sugiyono (2013). Metode Penelitian Kuantitatif Kualitatif dan R&D. *Journal of Chemical Information and Modeling, 53*(9). Alfabeta.

Bireda, A. D., & Pillay, J. (2018). Perceived parent–child communication and well-being among Ethiopian adolescents. I*nternational Journal of Adolescence and Youth, 23*(1), 109-117. https://doi.org/10.1080/02673843.2017.1299016

Lavy, S., & Naama-Ghanayim, E. (2020). Why care about caring? Linking teachers' caring and sense of meaning at work with students' self-esteem, well-being, and school engagement. *Teaching and Teacher Education, 91*(June). https://doi.org/10.1016/j.tate.2020.103046

Moore, G. F., Cox, R., Evans, R. E., Hallingberg, B., Hawkins, J., Littlecott, H. J., Long, S. J., & Murphy, S. (2018). School, Peer and Family Relationships and Adolescent Substance Use, Subjective Wellbeing and Mental Health Symptoms in Wales : a Cross Sectional Study. *Child Ind Res, 11*(6), 1951-1965.

Harding, S., Evans, R., Morris, R., Gunnell, D., Ford, T., Hollingworth, W., Tilling, K., Bell, S., Grey, J., Brockman, R., Campbell, R., Araya, R., Murphy, S., & Kidger, J. (2019). Is teachers ' mental health and wellbeing associated with students ' mental health and wellbeing ? *Journal of Affective Disorders,* 242, 180-187.

Ranny, M, R. A. A., Rianti, E., Amelia, S. H., Novita, M. N. N., & Lestarina, E. (2017). Konsep Diri Remaja dan Peranan Konseling. *Jurnal Penelitian Guru Indonesia, 2*(2), 40-47.

Yusuf, D., & Setiawan, R. (2022). Covid-19: Relasi Sosial Siswa Di Banten Pada Pembelajaran Jarak Jauh (Pjj). *DIMENSIA: Jurnal Kajian Sosiologi, 10*(2), 115-128. https://doi.org/10.21831/dimensia.v10i2.47297

Cahyono, M. Y. M., Chrisantiana, T. G., & Theresia, E. (2021). Peran Student Well-Being dan School Climate terhadap Prestasi Akademik pada Siswa SMP Yayasan "X" Bandung. *Humanitas (Jurnal Psikologi), 5*(1), 1-16. https://doi.org/10.28932/humanitas.v5i1.3523

Løhre, A., Moksnes, U. K., & Lillefjell, M. (2014). Gender differences in predictors of school wellbeing? *Health Education Journal, 73*(1), 90-100. https://doi.org/10.1177/0017896912470822

Juliano P, S. (2015). Komunikasi dan Gender : Perbandingan Gaya Komunikasi Dalam Budaya Maskulin dan Feminim. *JIPSI - Jurnal Ilmu Politik Dan Komunikasi, 5*(1), 19-30. https://repository.unikom.ac.id/30705/1/sangra-juliano-p.pdf

Jannah, M. (2017). Remaja Dan Tugas-Tugas Perkembangannya Dalam Islam. Psikoislamedia: *Jurnal Psikologi, 1*(1), 243-256. https://doi.org/10.22373/psikoislamedia.v1i1.1493

ПОКРАЩЕННЯ САМОПОЧУТТЯ УЧНІВ: ЧИ МАЮТЬ ЗНАЧЕННЯ СТАТЬ І МІЖОСОБИСТІСНЕ СПІЛКУВАННЯ?

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Статья: 7 с., 6 табл., 1 рис., 30 джерел.

Мета дослідження. Побудова соціальної взаємодії є непростим завданням, яке вимагає докладання значних зусиль, через труднощі в ясності спілкування та пристосуванні до нових систем навчання. Цю ситуацію значно ускладнює пандемія Covid-19. Така несприятлива ситуація зумовлює потребу в сприянні гарному самопочуттю учнів, хоча, безумовно, ускладнює досягнення цієї мети. Метою цього дослідження було вивчення впливу міжособистісного спілкування на само-

почуття учнів 10-х та 11-х класів мусульманської релігійної школи другого ступеня, розташованої в регентстві Баньюмас (Індонезія), з огляду на їхню стать під час навчання в період пандемії.

Матеріали та методи. У цьому дослідженні використовували кількісний метод шляхом тестування простої лінійної регресії та t-критерій Стьюдента. Досліджувану вибірку складали загалом 265 учнів, відібраних методом пропорційної стратифікованої випадкової вибірки. У засобах вимірювання в цьому дослідженні використовували шкалу самопочуття учнів зі ступенем внутрішньої надійності за коефіцієнтом α Кронбаха = 0,835 та шкалу міжособистісного спілкування зі ступенем внутрішньої надійності за коефіцієнтом α Кронбаха = 0,761.

Результати. Результати цього дослідження показали, що: 1) міжособистісне спілкування впливає на варіацію самопочуття учнів на 20,1%; 2) статистично значущої різниці в самопочутті учнів чоловічої та жіночої статі не спостерігалося. Проте різниця в міжособистісному спілкуванні між учнями чоловічої та жіночої статі була статистично значущою.

Висновки. Таким чином, відповідно до результатів цього дослідження, для уможливлення покращення самопочуття учнів необхідно тренувати навичку міжособистісного спілкування.

Ключові слова: міжособистісне спілкування, самопочуття учнів, учні.

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ORIGINAL SCIENTIFIC ARTICLE

STRENGTH ABILITIES: ASSESSMENT AND SPECIFIC FEATURES OF THE DEVELOPMENT OF ELEMENTARY SCHOOL-AGED KARATE BOYS

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Abstract

The purpose of this study is to determine the age-specific features of the manifestation of differences in the strength fitness of younger grade boys who attend a karate class at the sports and health stage.

Materials and methods. The study participants were 57 children who were tested to determine their level of strength abilities. They were divided into four age groups: 7-year-old boys (n=14), 8-year-old boys (n=15), 9-year-old boys (n=15), and 10-year-old boys (n=13). The children and their parents were informed about all the features of the study and gave their consent to participate in the experiment. The children's technical level corresponded to the student grades of 10th or 9th Kyu (Orange Belt). The solution of the set tasks involved the use of the following research methods: review and analysis of scientific and methodical literature, pedagogical observation, timing of educational tasks, testing of strength abilities, pedagogical ascertaining experiment, methods of mathematical statistics.

Results. Statistically significant age-specific differences were observed between the groups of boys aged 7 and 8 in the results of the following tests: push-ups (p=0.0001), 30 second sit-ups (p=0.001), pull-ups and chin-ups (p=0.008), flexed-arm hang (p=0.003), left hand dynamometry (p=0.023), standing long jump (p=0.0001); between the groups of boys aged 8 and 9 in the results of the following tests: 30 second sit-ups (p=0.046), pull-ups and chin-ups (p=0.004), flexed-arm hang (p=0.002); between the groups of boys aged 9 and 10 in the results of the following tests: standing long jump (p=0.014).

Conclusions. It was established that the boys have differences in various structural elements that characterize strength indicators. And these differences are in line with the age indicators and technical level of the karatekas.

Keywords: boys, strength abilities, kyokushinkai karate, younger grade students.

Introduction

Childhood and early adolescence are considered to be critical periods for the development of the best possible physical literacy (Balyi, Way & Higgs, 2013; Lloyd, Cronin, Faigenbaum et al., 2016). Physical literacy is defined as people's ability, confidence and desire to be physically active throughout life and is considered the cornerstone of health and fitness (Whitehead, 2001; Farrey, Isard et al., 2015; Farrey, Isard, Chalipet et al., 2015).

There is growing recognition that a basic set of motor skills should be learned in childhood to ensure long-term participation in physical activity (Volkov, 2002; Platonov, 2015; Zwolski, Quatman-Yates & Paterno, 2017). Childhood is a sensitive period for learning and mastering basic motor skills. Motor skill mastery is positively related to health, fitness, and academic performance (Boutios, Fiorilli, Buonsenso et al., 2021; Marchenko, Jagiello, Iermakov et al., 2021; Marchenko, Ivashchenko, Jagiello et al., 2022). Of particular concern is the lack of muscular fitness in children, which is considered a vital component of the health, well-being and success of young people who want to participate in sports and health activities (Runhaar, Collard, Singh et al., 2010; Cohen, Voss, Taylor et al., 2011; Smith, Eather, Morgan et al., 2014).

Strength abilities are one of the components that are the foundation for learning motor actions (Khudolii, Ivashchenko, Iermakov, Nosko & Marchenko, 2019; Minenko & Marchenko, 2021; Kim, Won & Shin, 2021). The acquisition of strength and motor competence is achieved not only through growing up, but also through constant interaction with a stimulating and supportive social and physical environment (Balushka, Khimenes, Okopnyi, Pityn, Sohor & Tkach, 2020; Marchenko & Satdyiev, 2021; Marchenko & Handymov, 2021).

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Training in a kyokushinkai karate class can produce improvement in children's physical condition (Chyu, 2010; Pinto-Escalona, Gobbi, Valenzuela et al., 2021; Driukov & Marchenko, 2021), their good neuromuscular coordination and balance (Marchenko & Bezpalko, 2020; Boutios, Fiorilli, Buonsenso et al., 2021; Marchenko & Verdysh, 2021), harmony of their movements (Leong, Fu, Ng & Tsang, 2011; Pons van Dijk, Lenssen, Leffers, Kingma & Lodder, 2013), development of their motor skills (Ma & Qu, 2017; Marchenko & Satdyiev, 2021), and teaching them combat skills (Błaszczyszyn, Szczęsna, Pawlyta, Marszałek & Karczmit, 2019; Marchenko & Kovalenko, 2020; Litvin & Marchenko, 2021). Strength development is a prerequisite for learning, improving, stabilizing, and applying karate skills and related performance techniques (Saienko, 2012; Graham, Li, Bray & Cairney, 2018; Balushka, Khimenes, Okopnyi, Pityn, Sohor & Tkach, 2020).

Whereas the conditioning profile of adult karate athletes is widely documented in sports strength studies (Margaritopoulos, Theodorou, Methenitis, Zaras, Donti & Tsolakis, 2015; Pal, Joginder, Kalra & Sindhu, 2020; Kabadayı, Karadeniz, Yılmaz et al., 2022), virtually nothing has been published about young athletes at the sports and health stage, which includes school students aged between 6 and 15.

The analysis of literary sources showed the absence of objective data on the level and specific features of the development of strength abilities in school students aged 7 to 10 who take kyokushinkai karate classes at the sports and health stage. This does not allow to fully implement the selection of means and methods for the high-quality implementation of the educational and training process and the development of effective programs for physical training of children. The investigation of the age-specific patterns and regularities of the development of strength abilities is a problem of relevance as regards the training of young karatekas.

The purpose of this study was to determine the age-specific features of the manifestation of differences in the strength fitness of younger grade boys who attend a karate class at the sports and health stage.

Materials and methods

Study participants

The study participants were 57 children who were tested to determine their level of strength abilities. The study sample was divided into four age groups: 7-year-old boys (n=14), 8-year-old boys (n=15), 9-year-old boys (n=15), and 10-year-old boys (n=13). The children and their parents were informed about all the features of the study and gave their consent to participate in the experiment. The children's technical level corresponded to the student grades of 10th or 9th Kyu (Orange Belt). All the participants did regular practical training, which comprised 3 classes per week, each about 90 minutes long. The inclusion criteria were the absence of injuries in the last 2 months and the absence of intake of medication that could affect the correct performance of tests.

Ethical considerations. Ethical approval of the entire study was obtained from the Ethics Committee of H.S. Skovoroda Kharkiv National Pedagogical University. All the participants were given an information sheet detailing the study conditions. The study procedure and possible risks were explained to all the participants and their parents by members of the research team. The participants were informed that they could withdraw from the study at any time and for whatever reason without explanation. Informed consent was obtained from all the participants and their parents. All procedures were performed in accordance with the Declaration of Helsinki.

Study organization

The solution of the set tasks involved the use of the following research methods: review and analysis of scientific and methodical literature, pedagogical observation, timing of educational tasks, testing of strength abilities, pedagogical ascertaining experiment, methods of mathematical statistics.

Strength fitness testing was conducted and evaluated using a battery of fitness tests that comprehensively characterize various manifestations of strength abilities. The tests were chosen depending on the subject matter and were included in the analysis according to the purpose of the study. The tasks performed during the examination of the children were assessed using quantitative indicators (Eurofit, 1993; Serhiienko, 2010; Đurić, Sember, Starc, Sorić, Kovač & Jurak, 2021).

Control exercises were carried out in the gym and on the sports field of the school. Before the examination, a set of exercises (10–15 minutes) was performed, which included running, jumping, general physical development exercises, and movement games. It was aimed at preparing the children to perform the test tasks.

Statistical analysis

The study used IBM SPSS 26 software application. The following parameters were calculated: arithmetic mean value (X), standard deviation, which characterizes the variability of the characteristic (S), independent samples t-test, Mann-Whitney U-test. The hypothesis of equality of variances for the compared groups was determined using Levene's test.

Results

The statistical analysis data are provided in Tables 1–6. In the age groups of 7 to 8 years, Levene's test indicates heterogeneity of variances in the tests 'Push-ups' and 'Flexed-arm hang' ($p<0.05$). In this case, the use of the independent samples t-test is unjustified. The same condition is observed in the 'Pull-ups and chin-ups' test in the samples of boys aged 8 to 9 years ($p<0.05$). This requires the use of other tests. We chose the non-parametric Mann-Whitney U-test (Tables 2, 3, and 5). In all other tests of the age groups of 7 to 8, 8 to 9, and 9 to 10 years, the level of significance according to Levene's test is greater than 0.05, therefore, the use of the independent samples t-test is justified.

The obtained levels of significance of the empirical t-tests demonstrate that there are statistically significant differences ($p<0.05$) between the groups of boys aged 7 and 8 years according to the results of the tests 'Pull-ups and chin-ups' ($p=0.008$), 'Standing long jump' ($p=0.001$), '30 second sit-ups' ($p=0.001$), and 'Left hand dynamometry' ($p=0.023$). No statistically significant differences are observed in the test 'Right hand dynamometry' ($p=0.089$).

Table 1. Analysis of the specific features of the manifestation of strength abilities in boys aged 7 to 8 years

Investigated indicators	Test for independent samples							
	Levene's test		t-test for equality of means					
	F	p	t	p	Δx	Δs	95% confidence interval for the difference	
							Lower	Upper
Push-ups, times	4.590	.041	-6.181	.000	-11.41	1.847	-15.203	-7.625
Pull-ups and chin-ups, times	1.874	.182	-2.873	.008	-1.595	.555	-2.734	-.456
Flexed-arm hang, s	9.528	.005	-3.832	.001	-7.096	1.852	-10.895	-3.297
Standing long jump, cm	0.108	.745	-5.910	.000	-31.09	5.260	-41.884	-20.297
30 second sit-ups, times	1.582	.219	-3.569	.001	-4.624	1.296	-7.282	-1.966
Right hand dynamometry, kg	3.486	.073	-1.762	.089	-1.743	.989	-3.773	.287
Left hand dynamometry, kg	2.870	.102	-2.404	.023	-2.167	.901	-4.016	-.317

Equal variances are assumed

Table 2. Analysis of the specific features of the manifestation of dynamic strength in the test 'Push-ups' in boys aged 7 to 8 years

Summary of the Mann-Whitney U-test for independent samples	
Total	29
Mann-Whitney U value	210.0
Wilcoxon W value	330.0
Test statistics	210.0
Standard error	22.834
Standardized test statistics	4.598
Asymptotic significance (2-tailed test)	0.000
Exact significance (2-tailed test)	0.000

Table 3. Analysis of the specific features of the manifestation of static strength in the test 'Flexed-arm hang' in boys aged 7 to 8 years

Summary of the Mann-Whitney U-test for independent samples	
Total	29
Mann-Whitney U value	173.000
Wilcoxon W value	293.000
Test statistics	173.000
Standard error	22.854
Standardized test statistics	2.975
Asymptotic significance (2-tailed test)	0.003
Exact significance (2-tailed test)	0.002

Table 4. Analysis of the specific features of the manifestation of strength abilities in boys aged 8 to 9 years

Investigated indicators	Test for independent samples							
	Levene's test		t-test for equality of means					
	F	p	t	p	Δx	Δs	95% confidence interval for the difference	
							Lower	Upper
Push-ups, times	0.276	0.604	-1.291	0.207	-3.0	2.325	-7.762	1.762
Pull-ups and chin-ups, times	4.626	0.040	-3.407	0.002	-2.667	0.783	-4.270	-1.063
Flexed-arm hang, s	0.048	0.828	-3.459	0.002	-8.203	2.372	-13.061	-3.345
Standing long jump, cm	2.397	0.133	-1.002	0.325	-4.667	4.656	-14.204	4.871
30 second sit-ups, times	0.063	0.804	-2.087	0.046	-2.533	1.214	-5.019	-0.047
Right hand dynamometry, kg	0.319	0.576	-1.739	0.093	-1.533	0.882	-3.340	0.273
Left hand dynamometry, kg	2.414	0.131	-1.390	0.176	-1.333	0.959	-3.299	0.632

Equal variances are assumed

Tables 2 and 3 show the null hypothesis testing analysis using the independent samples Mann-Whitney U-test. Since the asymptotic significance of the U-test is $p<0.05$, the null hypothesis about the equal distribution of results in the tests 'Push-ups' ($p=0.001$) and 'Flexed-arm hang' ($p=0.003$) among the groups of boys aged 7 to 8 years on the basis of age is rejected. The differences between the values of the specified parameters in these samples are significant.

A positive dependence of the level of development of strength abilities on age was observed in young karatekas aged 7–8 years (Table 1). The 8-year-old boys demonstrate a higher level of strength fitness in general compared to the 7-year-old boys. Especially as regards the manifestation of strength endurance, dynamic and explosive strength. This may be due to the fact that the first period of the boys' muscular system development begins from the age of 8, and not only the weight of the muscles increases, but also their physical and chemical properties change, and the innervation ratios are enriched. Muscle strength becomes greater. Age-related strength gains occur to some extent independent of physical loads.

The analysis of the specific features of the manifestation of strength abilities in boys aged 8 to 9 years (Table 4) showed that there is a statistically significant difference in the performance indicators of the tests 'Pull-ups and chin-ups' ($p=.004$), 'Flexed-arm hang' ($p=.002$), and '30 second sit-ups' ($p=.046$). No differences were found in the correlation of results between the samples in the tests 'Push-ups' ($p=.207$),

Table 5. Analysis of the specific features of the manifestation of dynamic strength in the test 'Pull-ups and chin-ups' in boys aged 8 to 9 years

Summary of the Mann-Whitney U-test for independent samples	
Total	30
Mann-Whitney U value	180.50
Wilcoxon W value	300.50
Test statistics	180.50
Standard error	23.858
Standardized test statistics	2.850
Asymptotic significance (2-tailed test)	0.004
Exact significance (2-tailed test)	0.004

'Standing long jump' (p=.325), 'Right hand dynamometry' (p=.093), and 'Left hand dynamometry' (p=.176).

A characteristic feature of the development of these age groups of school students is a higher level of strength development of the muscles of the torso compared to the muscles of the limbs. Due to the disparity between the work of the lower and upper parts of the body, it is advisable to recommend more exercises for the development of the upper part of the body: throwing, climbing a rope or gymnastic wall bars, crawling, game instruments with combat sport elements, exercises involving partners' resistance, pulling, pushing, etc. It appears that training capacity in terms of relative strength gains is greater in child athletes than in adolescents. Therefore, specific means of development of strength, which are used in combat sports, can be particularly effective.

The boys aged 10 (Table 6) demonstrate a higher level of the manifestation of explosive muscular strength compared to the 9-year-old boys. A statistically significant difference between adjacent years is observed (p=.014). This can partly be explained by the beginning of the sensitive period of development of this ability at the age of 10–11. No statistically significant differences were found between the samples of 9–10-year-old boys based on the results of testing of all other types of manifestation of strength abilities (p>0.05). The age-specific characteristics of the boys of these groups do not affect the level of strength endurance and dynamic and static strength.

It is possible that the means of karate have a sufficient positive effect on the level of development of strength abilities, and therefore, 9-year-old children who have some training experience are little different from 10-year-old children in terms of strength indicators of various types. According to Marchenko and Ishchenko (2016), significant increases in strength indicators in elementary school-aged boys can be observed with rational organization of strength-oriented loads.

Discussion

It was assumed that the study of the age-specific features of the strength fitness of boys aged 7 to 10, who attend a kyokushinkai karate class at the sports and health stage, will allow physical education teachers, instructors and coaches to implement the education and training process in a quality manner, to prepare the musculoskeletal system of children to master the technical elements of karate, and to further promote the maximum realization of individual potential.

Opinions regularly appear in the literature that Fundamental Movement Skills (FMS: running, jumping, dribbling and catching a ball, etc.) are the basis of physical competence (Barnett, Stodden, Cohen et al., 2016; Edwards, Bryant, Keegan et al., 2017; Marchenko & Verdysh, 2021). School students' FMS demonstrate a strong positive relationship with their level of physical activity (Barnett, Stodden, Cohen et al., 2016; Pullen, Oliver, Lloyd & Knight, 2020). However, the authors note a significant decrease in motor activity, which requires expanding the use of new means of physical education. Kyokushinkai karate has shown itself to be good in this respect.

The WHO (World Health Organization) guiding Global recommendations on physical activity state that young children should participate in activities that support the musculoskeletal tissue and improve movement control at least 3 times a week (Chaput, Willumsen, Bull et al., 2020). Our studies complement the findings of Marchenko & Kozar (2015), Pinto-Escalona, Gobbi, Valenzuela et al. (2021) about the need to involve children as much as possible in mass and sports events in out-of-class and out-of-school activities.

The obtained results match the data of Pochettia, Ponczosznika, Filártigaa et al. (2018), Marchenko & Satdyiev (2021), Marchenko & Handymov (2021) that regular strength training exercises can help increase motor activity, improve physical fitness and individual health only when they are part of a general physical education or sports program.

Table 6. Analysis of the specific features of the manifestation of strength abilities in boys aged 9 to 10 years

Test for independent samples								
Investigated indicators	Levene's test		t-test for equality of means					
	F	p	t	p	Δx	Δs	95% confidence interval for the difference	
							Lower	Upper
Push-ups, times	1.034	0.319	-0.549	0.588	-1.569	2.860	-7.447	4.309
Pull-ups and chin-ups, times	0.485	0.492	-0.417	0.680	-0.436	1.045	-2.583	1.712
Flexed-arm hang, s	0.001	0.981	-1.051	0.303	-2.479	2.360	-7.329	2.371
Standing long jump, cm	0.063	0.804	-2.639	0.014	-8.831	3.347	-15.710	-1.952
30 second sit-ups, times	1.060	0.313	-0.239	0.813	-0.354	1.483	-3.402	2.694
Right hand dynamometry, kg	0.569	0.457	-1.846	0.076	-1.944	1.053	-4.107	0.220
Left hand dynamometry, kg	0.002	0.967	-1.266	0.217	-1.462	1.154	-3.834	0.911

Equal variances are assumed

During the investigation of the patterns and regularities of the development of strength abilities, new information was obtained that the differences between 9–10-year-old boys in most indicators are somewhat leveled. The obtained mean values slightly exceed the average indicators proposed in the normative tables (Serhiienko, 2010) and the results we obtained in the previous studies (Khudolii & Marchenko, 2007; Marchenko, 2008; Marchenko & Satdyiev, 2021).

Conclusions

The analysis of scientific and pedagogical literature made it possible to investigate the structure of the motor ability 'strength' and to reveal the need for the development of strength abilities as an important component of motor fitness in kyokushinkai karate at the initial stage of classes for younger grade boys.

The importance of systematic monitoring of strength fitness in children has been revealed and confirmed, as it is one of the main characteristics of health and is considered the basis of an active lifestyle, especially during the period of their active development.

According to the study results, statistically significant age differences are observed between the groups of boys aged 7 to 8, 8 to 9, and 9 to 10 in the results of the tests characterizing different aspects of strength abilities.

Dynamic strength: push-ups – aged 7 and 8 (p=.0001); 30 second sit-ups – aged 7 and 8 (p=.001), aged 8 and 9 (p=.046); pull-ups and chin-ups – aged 7 and 8 (p=.008), aged 8 and 9 (p=.004).

Strength endurance: flexed-arm hang – aged 7 and 8 (p=.003), aged 8 and 9 (p=.002).

Static strength: left hand dynamometry – aged 7 and 8 (p=.023).

Explosive muscular strength: standing long jump – aged 7 and 8 (p=.0001), aged 9 and 10 (p=.014).

It was established that the boys have differences in various structural elements that characterize strength indicators. And these differences are in line with the age indicators and technical level of the karatekas.

Conflict of interest

All authors have read and approved the final version of the manuscript and declare no conflict of interest.

References

Balyi, I., Way, R., & Higgs, C. (2013). *Long-term Athlete Development.* Champaign, IL: Human Kinetics, 51-5081.

Lloyd, R. S., Cronin, J. B., Faigenbaum, A. D., Haff, G. G., Howard, R., Kraemer, W. J., Micheli, L. J., Myer, G. D., & Oliver, J. L. (2016). National Strength and Conditioning Association Position Statement on Long-Term Athletic Development. *Journal of Strength and Conditioning Research, 30*(6), 1491-1509. https://doi.org/10.1519/JSC.0000000000001387

Whitehead, M. (2001). The Concept of Physical Literacy. *European Journal of Physical Education, 6*(2), 127-138. https://doi.org/10.1080/1740898010060205

Farrey, T., Isard, R., et. al (2015). *Aspen Institute. Physical Literacy in the United States: A Model, Strategic Plan, and Call to Action.* Project Play. Sports & Society Program. Washington, DC.

Farrey, T., Isard, R., Chalipet, L., et. al (2015). *Aspen Institute. Sport for All, Play for Life: A Playbook to Get Every Kid in the Game.* Project Play. Washington, DC.

Volkov, L.V. (2002). *Teoriya i metodika detskogo i yunosheskogo sporta : ucheb. dlya vuzov.* Kiev: Olimpiyskaya literatura, 295. (In Russian)

Platonov, V.N. (2015). *Sistema podgotovki sportsmenov v olimpiyskom sporte. Obshchaya teoriya i ee prakticheskie prilozheniya: uchebnik* [dlya trenerov]: v 2 kn.. Almata: Kazakhskaya akademiya sporta i turizma, kn. 1. 680. (In Russian)

Zwolski, C., Quatman-Yates, C., & Paterno, M.V. (2017). Resistance Training in Youth: Laying the Foundation for Injury Prevention and Physical Literacy. *Sports Health, 9*(5), 436-443. https://doi.org/10.1177/1941738117704153

Boutios, S., Fiorilli, G., Buonsenso, A., Daniilidis, P., Centorbi, M., Intrieri, M., & di Cagno, A. (2021). The Impact of Age, Gender and Technical Experience on Three Motor Coordination Skills in Children Practicing Taekwondo. *Int. J. Environ. Res. Public Health,* 18, 5998. https://doi.org/10.3390/ijerph18115998

Marchenko, S., Jagiello, W., Iermakov, S., Ivashchenko, O., & Khudolii, O. (2021). Pattern recognition: modes of teaching boys aged 10 mae-geri (front kick) technique in kyokushin karate. *ARCH BUDO,* 17, 253-261.

Marchenko, S., Ivashchenko, O., Jagiello, W., Iermakov, S., Khudolii, O., & Yermakova, T. (2022). Discriminant analysis: features of training 10-year-old boys in the technique of kicks in kyokushin karate. *ARCH BUDO,* 18, 1-11.

Runhaar, J., Collard, D.C., Singh, A.S., Kemper, H.C., van Mechelen, W., & Chinapaw, M. (2010). Motor fitness in Dutch youth: differences over a 26-year period (1980-2006). *J Sci Med Sport,* 13, 323-328. https://doi.org/10.1016/j.jsams.2009.04.006

Cohen, D.D., Voss, C., Taylor, M.J., Delextrat, A., Ogunleye, A.A., & Sandercock, G.R. (2011). Ten-year secular changes in muscular fitness in English children. *Acta Paediatr,* 100, 175-177. https://doi.org/10.1111/j.1651-2227.2011.02318.x

Smith, J.J., Eather, N., Morgan, P.J., Plotnikoff, R.C., Faigenbaum, A.D., & Lubans, D.R. (2014). The health benefits of muscular fitness for children and adolescents: a systematic review and meta-analysis. *Sports Med,* 44, 1209-1223. https://doi.org/10.1007/s40279-014-0196-4

Khudolii, O., Ivashchenko, O., Iermakov, S., Nosko, Y., & Marchenko, S. (2019). Strength Abilities: Estimation of Immediate Training Effect of Strength Loads in Girls Aged 7 Years. *Physical Education Theory and Methodology, 19*(2), 98-104. https://doi.org/10.17309/tmfv.2019.2.06

Minenko, E., & Marchenko, S. (2021). Improvement of the Process of Teaching the Technique Boys Aged 10 Ushiro Geri Kekomi (Back Kick). *Journal of Learning Theory and Methodology, 2*(2), 91-97. https://doi.org/10.17309/jltm.2021.2.06 (in Ukrainian)

Kim, E., Won, Y., & Shin, J. (2021). Analysis of Children's Physical Characteristics Based on Clustering Analysis. *Children,* 8, 485. https://doi.org/10.3390/children8060485

Balushka, L., Khimenes, K., Okopnyy, A., Pityn, M., Sogor, O., & Tkach, Y. (2020). Preparedness Dynamics of Pupils of Lyceum with Enhanced Military and Physical Training

Under the Influence of the Wrestling Means Use. *Physical Education Theory and Methodology, 20*(3), 165-173. https://doi.org/10.17309/tmfv.2020.3.06 (in Ukrainian)

Marchenko, S., & Satdyiev, B. (2021). Effectiveness of Using Active Games for Strength Development in 10-Year-Old Boys at the Initial Training Stage in Kyokushin Karate. *Physical Education Theory and Methodology, 21*(1), 84-89. https://doi.org/10.17309/tmfv.2021.1.11

Marchenko, S., & Handymov, B. (2021). Development of Strength Abilities Using Play Techniques with Elements of Martial Arts at the Sports and Recreational Stage in 10-Year-Old Girls. *Journal of Learning Theory and Methodology, 2*(2), 68-74. https://doi.org/10.17309/jltm.2021.2.03 (in Ukrainian)

Chyu, M. (2010). A non-competitive martial arts exercise program for health and fitness in the general population. *Journal of Human Sport and Exercise, 5*(3), 430-443. https://doi.org/10.4100/jhse.2010.53.13

Pinto-Escalona, T. et al. (2021). Effects of a school-based karate intervention on academic achievement, psychosocial functioning, and physical fitness: A multicountry cluster randomized controlled trial. *Journal of Sport and Health Science,* S2095254621000715. https://doi.org/10.1016/j.jshs.2021.06.005

Driukov, V., & Marchenko, S. (2021). Factor Model of Selection of 9-Year-Old Girls in Kyokushinkai Karate Section. *Journal of Learning Theory and Methodology, 2*(3), 119-127. https://doi.org/10.17309/jltm.2021.3.03

Marchenko, S., & Bezpalko, D. (2020). Control and Assessment of 7-Year-Old Boys' Coordination Abilities at the Initial Training Stage in Kyokushin Karate. *Journal of Learning Theory and Methodology, 1*(2), 82-88. https://doi.org/10.17309/jltm.2020.2.06

Marchenko, S., & Verdysh, Y. (2021). Assessment of Reliability and Informativeness of Coordination Fitness Indicators of 8-Year-Old Boys. *Journal of Learning Theory and Methodology, 2*(1), 21-28. https://doi.org/10.17309/jltm.2021.1.03

Leong, H.-T., Fu, S. N., Ng, G. Y. F., & Tsang, W. W. N. (2011). Low-level Taekwondo practitioners have better somatosensory organisation in standing balance than sedentary people. *European Journal of Applied Physiology, 111*(8), 1787-1793. https://doi.org/10.1007/s00421-010-1798-7

Pons van Dijk, G., Lenssen, A.F., Leffers, P., Kingma, H., & Lodder, J. (2013). Taekwondo training improves balance in volunteers over 40. *Frontiers in Aging Neuroscience,* 5, 10-14. https://doi.org/10.3389/fnagi.2013.00010

Ma, A.W.W., & Qu, L.H. (2017). Effects of Karate Training on Basic Motor Abilities of Primary School Children. *Advances in Physical Education,* 7, 130-139. https://doi.org/10.4236/ape.2017.72012

Błaszczyszyn, M., Szczęsna, A., Pawlyta, M., Marszałek, M., & Karczmit, D. (2019). Kinematic Analysis of Mae-Geri Kicks in Beginner and Advanced Kyokushin Karate Athletes. *Int. J. Environ. Res. Public Health, 16*(17), 3155; https://doi.org/10.3390/ijerph16173155

Marchenko, S., & Kovalenko, K. (2020). Optimization of Teaching Boys Aged 10 Mae-Geri (Front Kick) Technique in Kyokushin Karate. *Journal of Learning Theory and Methodology, 1*(1), 33-39. https://doi.org/10.17309/jltm.2020.1.05

Litvin, A., & Marchenko, S. (2021). Programming the Process of Teaching Boys Aged 10 Yoko Gery Kekomi (Side Kick). *Journal of Learning Theory and Methodology, 2*(3), 111-118. https://doi.org/10.17309/jltm.2021.3.02

Saienko, V.H. (2012). *Pobudova i kontrol trenuvalnoho protsesu sportsmeniv v kiokushynkai karate: Monohrafiia.* Derzh. zakl. «Luhan. nats. un-t imeni Tarasa Shevchenka». Luhansk : SPD Rieznikov V.S., 404.

Graham, J.D., Li, Y.C., Bray, S.R., & Cairney, J. (2018). Effects of Cognitive Control Exertion and Motor Coordination on Task Self-Efficac and Muscular Endurance Performance in Children. *Front. Hum. Neurosci.,* 12, 379. https://doi.org/10.3389/fnhum.2018.00379

Margaritopoulos, S., Theodorou, A., Methenitis, S., Zaras, N., Donti, O., & Tsolakis, C. (2015). The effect of plyometric exercises on repeated strength and power performance in elite karate athletes. *Journal of Physical Education and Sport, 15*(2), 310-318. https://doi.org/10.7752/jpes.2015.02047

Pal, S., Joginder, Y., Kalra, S., & Sindhu, B. (2020). Different Training Approaches in Karate-A Review. *HuSS International Journal of Research in Humanities and Social Sciences, 20*(14), 33-43.

Kabadayı, M., Karadeniz, S., Yılmaz, A.K., Karaduman, E., Bostancı, Ö., Akyildiz, Z., Clemente, F.M., & Silva, A.F. (2022). Effects of Core Training in Physical Fitness of Youth Karate Athletes: A Controlled Study Design. *Int. J. Environ. Res. Public Health,* 19, 5816. https://doi.org/10.3390/ijerph19105816

Eurofit, C.O.E. (1993). *Handbook for the Eurofit test on physical fitness.* Strasbourg: Council of Europe.

Serhiienko, L.P. (2010). Sportyvna metrolohiia: teoriia i praktychni aspekty. K.: KNT,776.

Đurić, S., Sember, V., Starc, G., Sorić, M., Kovač, M., & Jurak, G. (2021). Secular trends in muscular fitness from 1983 to 2014 among Slovenian children and adolescents. *Scand J Med Sci Sports,* 31, 1853-1861. https://doi.org/10.1111/sms.13981

Marchenko, S., & Ishchenko, V. (2016). Methods of Strength Development in Boys of Primary School Age Using Active Games. *Physical Education Theory and Methodology, 16*(3), 19-27. https://doi.org/10.17309/tmfv.2016.3.1167

Barnett, L.M., Stodden, D., Cohen, K.E., Smith, J.J., Lubans, D.R., Lenoir, M., Livonen, S., Miller, A.D., Laukkanen, A., Dudley, D., et al. (2016). Fundamental movement skills: An important focus. *J. Teach Phys. Educ.,* 35, 219-225. https://doi.org/10.1123/jtpe.2014-0209

Edwards, L.C., Bryant, A.S., Keegan, R.J., Morgan, K., & Jones, A.M. (2017). Definitions, foundations and assosciations of physical literacy: A systematic review. *Sports Med.,* 47, 113-126. https://doi.org/10.1007/s40279-016-0560-7

Pullen, B.J., Oliver, J.L., Lloyd, R.S., & Knight, C.J. (2020). The Effects of Strength and Conditioning in Physical Education on Athletic Motor Skill Competencies and Psychological Attributes of Secondary School Children: A Pilot Study. *Sports (Basel), 8*(10), 138. https://doi.org/10.3390/sports8100138

Chaput, JP., Willumsen, J., Bull, F., Chou, R., Ekelund, U., Firth, J., Jago, R., Ortega, F.B., & Katzmarzyk, P.T. (2020). WHO guidelines on physical activity and sedentary behaviour for children and adolescents aged 5-17 years: summary of the evidence. *Int J Behav Nutr Phys. Act., 17*(141). https://doi.org/10.1186/s12966-020-01037-z

Marchenko, S., & Kozar, S. (2015). Methods of Using Innovative Game Practice in Extracurricular Physical Education of 5th-Graders. *Physical Education Theory and Methodology, 15*(3), 37-41. https://doi.org/10.17309/tmfv.2015.3.1147

Pochettia, J., Ponczosznika, D., Filártigaa, P.R., Testaa, N., Gaete, L., Agrelo, D.P., Morillo, M., Leyesa, P.J., & Galindoa, E. (2018). Comité Nacional de Medicina del Deporte Infantojuvenil. Entrenamiento de la fuerza en niños y adolesentes: beneficios, riesgos y recomendaciones. *Arch Argent Pediatr., 116*(5), 82-91. https://doi.org/10.5546/aap.2018.S82

Khudolii, O.M., & Marchenko, S.I. (2007). Modeliuvannia rozvytku shvydkisno-sylovykh zdibnostei u shkoliariv 2-4 klasiv zasobamy rukhlyvykh ihor. *Pedahohika, psykholohiia ta medyko-biolohichni problemy fizychnoho vykhovannia i sportu: naukova monohrafiia za red. prof.* Yermakova S.S. Kharkiv: KhDADM (KhKhPI), (8), 139-142.

Marchenko, S.I. (2008). *Umovy efektyvnoho rozvytku rukhovykh zdibnostei u shkoliariv molodshykh klasiv zasobamy rukhlyvykh ihor.* (Avtoref. dys. kand. nauk z fiz. vykh. i sportu). Kharkivska derzhavna akademiia fizychnoi kultury, Kharkiv.

СИЛОВІ ЗДІБНОСТІ: ОЦІНКА ТА ОСОБЛИВОСТІ РОЗВИТКУ ХЛОПЦІВ КАРАТИСТІВ МОЛОДШОГО ШКІЛЬНОГО ВІКУ

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Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 7 с., 6 табл., 48 джерел.

Мета дослідження – визначити вікові особливості прояву відмінностей у силовій підготовленості хлопців молодших класів, які займаються в секції карате на спортивно-оздоровчому етапі.

Матеріали і методи. У дослідженні взяли участь 57 дітей, які пройшли тестування для визначення рівня розвитку силових здібностей. Вони були розподілені на чотири вікові групи: хлопці 7 років (n=14), 8 років (n=15), 9 років (n=15), 10 років (n=13). Діти та їхні батьки були інформовані про всі особливості дослідження і дали згоду на участь в експерименті. Технічний рівень дітей відповідав учнівським ступеням 10-9 Кю (помаранчевий колір поясу). Для вирішення поставлених завдань були використані методи дослідження: вивчення та аналіз науково-методичної літератури, педагогічне спостереження, хронометраж навчальних завдань, тестування силових здібностей педагогічний констатуючий експеримент, методи математичної статистики.

Результати. Статистично достовірні вікові розбіжності спостерігаються між групами хлопців 7-8 років за результатами тестів: згинання і розгинання рук в упорі лежачи (p=0,0001), піднімання в сід за 30с (p=0,001), згинання і розгинання рук у висі (p=0,008), вис на зігнутих руках (p=0,003), динамометрія лівої руки (p=0,023), стрибок у довжину з місця (p=0,0001); 8-9 років: піднімання в сід за 30 с (p=0,046), згинання і розгинання рук у висі (p=0,004), вис на зігнутих руках (p=0,002); 9-10 років: стрибок у довжину з місця (p=0,014).

Висновки. Встановлено, що між хлопцями існують відмінності за різними структурними ланками, що характеризують показники сили. І ці відмінності відповідають віковим показникам і технічному рівню каратистів.

Ключові слова: хлопці, силові здібності, кіокушинкай карате, школярі молодших класів.

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REVIEW ARTICLE

INFLUENCING FACTORS AND CURRENT APPROACHES TO ACADEMIC DISHONESTY IN THE PHILIPPINES DURING COVID-19 PANDEMIC: AN OVERVIEW

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

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Abstract

Study purpose. As the Philippines welcomes its new school year, academic dishonesty remains a prevalent concern in the academe. To provide an overview of the situation, this review paper was developed with the goal of presenting current information about academic dishonesty through 1) identification of influencing factors and 2) application of current approaches to academic dishonesty.

Materials and methods. Utilizing review of existing literature, this study described possible internal (laziness or procrastination, lack of proper time management, fear of failure, poor learning capability, motivation, state of mental health, self-attitude, capability, and intention) and external influencing factors (peer involvement, overwhelming academic workload, difficulty of subject/course, limited assistance of teachers, parental expectations, and use of digital technology) and current approaches to academic dishonesty (deterrence theory, rational choice theory, neutralization theory, planned behavior theory, as ignorance or confusion on teacher's expectations, as learned behavior, and as coping strategy to stressful environment) that will serve as a reference point for researchers in investigating the extent of academic dishonesty in the country.

Results and conclusions. Similarly, findings revealed here can assist teachers, school administrators, and policymakers in crafting more effective solutions to limit or eliminate any forms of academic dishonesty within educational institutions.

Keywords: academic dishonesty, online learning, modular learning, pandemic, Philippine education.

Introduction

Undeniably, COVID-19 pandemic created a situation that adversely affected students' learning motivation and learning environment for the past two school years (Baticulon et al., 2020; Fabito et al., 2020; Barrot et al., 2021; Hidalgo et al., 2021; Salazar et al., 2021; Aguilar, 2021; Espina & Monte, 2022). As the Philippines transitioned and retained both online learning and modular learning setup for the past two years, students across the country faced numerous concerns that arise as they continue their education during the pandemic. Their concerns range from internet connections issues and technological literacy to difficulty in comprehending and accomplishing academic requirements (Fabito et al., 2020; Barrot et al., 2021; Salazar et al., 2021; Jaca, 2022; Espina & Monte, 2022; Manalo et al., 2022; Meniano & Tan, 2022). The lack of conducive learning space, as well as the presence of distractions in their environment was exposed as an important concern to be addressed (Fabito et al., 2020; Barrot et al., 2021; Aguilar et al., 2021). On top of this, students expressed how their mental health had worsened, affecting their overall learning motivation (Baticulon et al., 2020; Barrot et al., 2021; Rotas & Cahapay, 2021; Salazar et al., 2021).

However, another concern that proliferated as the pandemic school years forced students to attend classes, finish their modules, and study was the proliferation of academic dishonesty (Moralista & Oducado, 2020; Pagaddu, 2021; Lopena et al., 2021; Aguilar et al., 2021; Frigillano, 2021; Galang et al., 2021; Balba & Caingcoy, 2021; Alvarez et al., 2022; Bautista & Pentang, 2022; Pandan & Lomibao, 2022; Revilla & Libre, 2022; San Jose, 2022). Briefly, academic dishonesty was defined as "an act of fraud that violates the ethics of academic honesty in schools and will damage public trust in educational institutions" (Yang et al., 2017, as cited in Cardina et al., 2022, p. 8706). According to Cardina and colleagues (2022), academic dishonesty consists of cheating during examinations, plagiarism, fabrication of information, and facilitation of similar acts to assist other students.

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Even before the pandemic school years, Moralista and Oducado (2020) revealed how teachers already expressed concern over the proliferation of academic dishonesty even before School Year 2020-2021 had started. Identifying if a student commits any form of academic dishonesty was perceived as more challenging an online learning setup (Lopena et al., 2021). In a modular setup, Galang and colleagues (2021) cited similar sentiments shared by public school teachers, in which parents' involvement made the situation even more difficult to discern and resolve. In addition, their study mentioned that the answer keys being indicated in the modules provided by school division offices furthered their frustrations. Results of Balba and Caingcoy's (2021) study showed that younger college students were likely to commit academic dishonesty compared to older students. In terms of gender, Pagaddu (2021) stated that while both genders practice acts of plagiarism, males are more likely to commit plagiarism than females, due to the latter having more capacity to multitask and properly manage their time.

In terms of actual behavior committed, Frigillano's (2021) explained that cheating in examinations were performed through studying old exams, students' sharing of answers, and deliberately copying other students' answers. Beruin (2022) also reported similar findings, adding that students were able to search examination answers via the internet. Frigillano's (2021) study also revealed how cheating was committed in assignments or projects primarily through collaboration in finishing individual task/s without teacher's permission. In terms of plagiarism, the use of another author's ideas without proper citation and referencing without thoroughly reading an article were revealed. Result of Beruin's (2022) study also reported the availability of some answers in YouTube that students utilized to accomplish their online activities. For Galang and colleagues (2021), modules submitted to teachers exhibit a different penmanship than the student's and blatant copying of answers from answer keys provided on actual modules. San Jose (2022) reported similar findings on parental involvement and added that students were likely to commit academic dishonesty when their friends are involved. Furthermore, Magsambol's (2021a) investigative report and Aguilar's (2021) study, students resorted to academic servicing to comply with their requirements. Magsambol uncovered that fellow students were providing such commissioned work, with social media (i.e., Twitter and Facebook) as their transaction medium. Results of Aguilar's (2021) complemented this news report, wherein academic servicing was also done by teachers and professors who saw this situation as an opportunity to earn while assisting struggling students. Furthermore, alleged reports of teachers giving and selling answers to students' learning modules was also publicized (Magsambol, 2021b). Yet what gained national traction was the expose concerning a Facebook community page named "Online Kopyahan" (Copying) or "Online Tulungan" (Working Together), created by high school students aimed at helping each other, especially those who were struggling during the pandemic (Perez, 2021). The misconduct was performed by sharing answers to examinations and written assessments/ modules in the said Facebook community page.

As the new school year is about to begin and blended learning was the promoted learning modality (Noriega, 2022; Patag, 2022), the possibility of committing academic dishonesty remains a key issue in the academe. Based on this information, this review paper was developed with the main goal of presenting current information about academic dishonesty through 1) identification of influencing factors and 2) application of current approaches to academic dishonesty.

Materials and methods

As a review paper, this study utilized a narrative literature review of journal articles and news/investigative articles, with the primary criteria of focusing on academic dishonesty in the Philippines during COVID-19 pandemic. The goal of a descriptive literature review is to synthesize existing literature of a specific topic as means of providing readers a more comprehensive background of the topic in focus (Paré & Kitsiou, 2017). Following Levy and Ellis' (2006, as cited in Paré & Kitsiou, 2017) proposed model, this study utilized the three step approach in conducting a systematic narrative review. The first step was literature search and screening. Using Google Search and Google Scholar Database, fourteen (14) journal articles were searched, one (1) of which indicated the Philippines as one of its settings, and six (6) news articles, one of which was an investigative report; all of which provided results as required by the primary criterion and were published from 2020-2022. Then, all selected literature were thoroughly read and validated to confirm its applicability in the study. The second step was data extraction and analysis. Extracted data were ensured to focus on the objectives of the study specifically, related to influencing factors and relevance to selected theoretical approaches. In terms of data analysis, qualitative narrative approach was utilized to describe the recurring influencing factors and applications of existing approaches to academic dishonesty based on analyzed and interpreted data, following the process employed by Cardina and colleagues in a similar study (2022). Following these processes, the final step in the Levy and Ellis' proposed framework was the actual writing of the literature review.

Influencing Factors behind Academic Dishonesty

In terms of influencing factors, the intricate framework laid down by Cardina and colleagues (2022) identifying the factors that led to students committing academic dishonesty in various universities across several countries (including the Philippines) was utilized in categorizing the possible influencing factors within the context of focus. Briefly, their study revealed two general factors that influence academic dishonesty: internal and external factors. Internal factors refer to causes within an individual that led to committing academic dishonesty. Conversely, external factors refer to causes external to a student/s. For the purpose of this review paper, both internal and external factors were utilized as primary categories wherein, related influencing factors from current literature on academic dishonesty during the pandemic were aligned accordingly.

Internal Influencing Factors

Under internal influencing factors, current studies presented laziness and procrastination as a primary factor. Ac-

cording to Aguilar (2021), some students were too lazy to accomplish tasks as they were busy playing with their friends, with social media, and disinterested to learn their lessons, hence resorting to acts of academic dishonesty. He also underlined that the idea that "someone else will do" the student's tasks was stated. Likewise, several studies confirmed similar results that influenced students to commit such acts (Pagaddu, 2021; Frigillano, 2021; Revilla & Libre, 2022; Alvarez et al., 2022; San Jose, 2022). Even the Department of Education recognized how this factor proliferates academic dishonesty (Perez, 2021). In relation to abovementioned factor, another factor reported among students was their lack of proper time management. San Jose (2022) cited that students were busy with other activities. Although in his study, participants were working and married, resulting to job-related or personal matters. Among male students, Pagaddu (2021) reported that the inability to multitask and properly manage their time led to higher odds of committing plagiarism. Nevertheless, the lack of proper time management in managing their studies was well-documented (Barrot et al., 2021; Jaca, 2022; Manalo et al., 2022; Meniano & Tan, 2022; Espina & Monte, 2022). In terms of online examination, time pressure was reported to cause students to commit cheat and attain passing scores (Revilla & Libre, 2022).

Another influencing factor revealed from existing studies was students' fear of failure and its subsequent consequences. Revilla and Libre's (2022) study emphasized how the fear of failing influenced students to commit academic dishonesty. Frigillano (2022) also cited a similar result, emphasizing how academic dishonesty was a means to avoid failing a test or a subject/course. Similarly, Aguilar (2021) reiterated what is already common knowledge, that fear of failing is always at the back of a student's mind. Something that was already present in previous pre-pandemic studies (Balbuena & Lamela, 2015; Diego, 2017; Gutierrez & Padagas, 2019). Additionally, Aguilar (2021) pointed out student's poor learning capability, another possible influencing factor that led to academic dishonesty. According to the results of his study, student's poor lesson comprehension and self-defeating mindset entailed them to acquire academic servicing. Alvarez and colleagues (2022) cited similar results, in which students were not smart enough to finish certain subjects. While other literatures did not provide similar findings, students' plight to learn and comprehend their lessons, specifically on their own, was also present in other literatures (Ditona & Rico, 2021; Galang et al., 2021; De Guzman, 2021; Meniano & Tan, 2022; Espina & Monte, 2022). In turn, this influencing factor is likely linked to the motivation factor discussed by Cardina and colleagues (2022). Briefly, motivation, according to them, refers to the stimulus that enables a student to do something. In the case of academic dishonesty, if students' learning motivation is inversely correlated to them committing such acts (Šprajc et al., 2017, as cited in Cardina et al., 2022).

Furthermore, a student's state of mental health was also revealed to influence their intention to commit academic dishonesty. According to Alvarez and colleagues (2022), when students feel stressed and worry over the expectations set around them, they are likely to cheat on quizzes, tests, and even their assignments. Beruin (2022) also reported that even those students who had adjusted well in an online learning setup, ultimately resorted to academic dishonesty due to the difficulty of their subjects or their situation in general. that even those students who had adjusted well in an online learning setup, ultimately resorted to academic dishonesty due to the difficulty of their subjects or their situation in general. The reality of students during the pandemic was how mental health-related concerns plagued most of their pandemic school years (Baticulon et al., 2020; Barrot et al., 2021; Rotas & Cahapay, 2021; Salazar et al., 2021). Lastly, while not explicitly stated among current literature, self-attitude, capability, and intention, were deemed as key internal factors when current data were understood through various analytical approaches presented in the succeeding sections. These three influencing factors were adapted from Cardina and colleagues (2022), to which they had operationalized them as follows: self-attitude as "students' feelings or how one behaves towards academic dishonesty" (p. 8710); capability as "students' ability to act on his knowledge and skills to acknowledge the results of others as his own"; and intention referring to that something that motivates a person to commit academic dishonesty, determined primarily by one's attitude towards it.

External Influencing Factors

Under external influencing factors, peer involvement was the most prevalent result across current resources. According to Frigillano (2021), when a student's friend/s allow them to copy their exam answers or receive help in finishing assignments without the teacher's consent, they are well-aware of committing academic dishonesty. The idea that everyone commits some form of academic dishonesty, particularly one's friends or classmates, influences a student to behave in the same manner. Likewise, Aguilar (2021) cited that peer influence plays a crucial role in committing academic dishonesty specifically, for students to "avoid having difficult time" with their academics (p. 310). Correspondingly, Perez' (2021) news report and San Jose's (2022) study revealed similar results, to which academic dishonesty is typically committed when one's friend/s are also involved.

Another influencing factor was the overwhelming academic workloads that students need to accomplish within a given period. Aguilar (2021) explained that one of the primary reasons why students resort to academic servicing was due to the overwhelming number of academic tasks they were required to submit. The weekly demands of their teachers, as well as their hectic deadlines likely influenced their negative behavior. Among male students, heavy workloads were also revealed as a reason for plagiarizing their tasks/projects (Pagaddu, 2021). As reported by Perez (2021), overwhelming or excessive academic workload was one of the reasons why students created the Facebook community page "Online Kopyahan" (Copying) or "Online Tulungan" (Working Together) (Perez, 2021) in the first place. Similar news reports cited how students were burdened with numerous tasks throughout the pandemic (Adonis, 2020; Hernando-Malipot, 2021; Cabreza, 2021; Hernando-Malipot, 2022), as well as related literature (Dangle & Sumaoang, 2020; Pinar, 2021; Manalo et al., 2022). In relation to this, the difficulty of subjects/courses was also revealed as an influencing factor to academic dishonesty. As cited by Revilla and Libre (2022), students tend to cheat when they are faced with a difficult subject/course, to lessen their

difficulties. Subjects/courses that students saw difficulties were typically the Match and Sciences (Robledo et al., 2021; Meniano & Tan, 2022; Nabayra, 2022).

Limited assistance of teachers was highlighted as an influencing factor. According to Aguilar (2021), as students fail to grasp their lessons and teachers asserted to be unresponsive to their academic concerns, academic dishonesty was their recourse to get passing grades. However, San Jose (2022) noted that students prefer seeking clarifications from their peers than their teachers, which can further worsen what was already a concern between student-teacher communication. In addition, parental expectations, typically attributed to receiving passing marks or even attaining higher grades was expressed as an influencing factor among students (Pagaddu, 2021; Frigillano, 2021; San Jose, 2022). Lastly, the use of digital technology, specifically utilizing the internet to commit academic dishonesty was observed as an influencing factor since it provides students with the opportunity to commit such acts with ease (Cruz et al., 2021; Frigillano, 2021; Revilla & Libre, 2022). This specific factor underlies the extensive use of social media to commit forms of academic dishonesty (Aguilar M. G., 2021; Magsambol, 2021a; Perez, 2021).

Current Approaches to Academic Dishonesty

For this review paper, seven (7) approaches were utilized based on the results of existing studies and supplementary articles, namely: 1) deterrence theory, 2) rational choice theory, 3) neutralization theory, 4) planned behavior theory, 5) academic dishonesty as ignorance or confusion on teacher's expectations, 6) academic dishonesty as learned behavior, and 7) academic dishonesty as coping strategy to a stressful environment. These approaches were adapted from DiPietro (2010)'s work that aimed to highlight current frameworks in the analysis of academic dishonesty within the educational sphere.

Deterrence Theory and Rational Choice on Academic Dishonesty

Both deterrence theory and rational choice theory view individuals as rational decision-makers (Akers, 1990). Deterrence theory posits that, as rational beings, the degree or severity of punishment for illegal, immoral, or deviant behavior compensates for any motivation to do such acts (Akers, 1990). Following this assumption, as cited by DiPietro (2010), if students are made aware that the consequences for committing academic dishonesty was little to non-existent, then students are likely to commit such acts. Pandan and Lomibao (2022) also reported that some teachers had perceived low integrity in their Math-related assessments due to the likelihood of cheating. Despite this, according to San Jose (2022), teacher's leniency or permissive personality during the pandemic were deemed by students as implied consent to cheat during exams and even plagiarize their submitted outputs. Teacher's non-action or toleration will likely result in proliferation of academic dishonesty.

Leniency in terms of school policies had long been associated with acts of academic dishonesty (Balbuena & Lamela, 2015). During the pandemic, leniency was one of the primary recommendations when students were abruptly required to transition to online and modular learning modalities (Baticulon et al., 2020). Thus, both the Department of Education (DepEd) and Commission on Higher Education (CHED) were enjoined to exercise academic leniency to protect students' health and well-being (CHED, 2020; Cervantes, 2020). If the results of San Jose's (2022) study were to be considered, then the possibility of grade inflation due to academic leniency must be revisited. Accordingly, an opinion piece highlighted by David (2022), wherein lenient university guidelines have the unintended consequence of an upsurge in the number of graduating students with Latin honors. There were also reports from DepEd indicating that the majority of passing grades that students received in 2021 were attributed to teachers' being 'considerate' to their students (see Gascon, 2021; Magsambol, 2021; De Guzman, 2021). Additionally, results of Frigillano's (2021) study cited that students' low regard of school policies was one of the reasons for committing academic dishonesty. On top of these, it must be noted that the shift to online learning modality afforded students with a self-paced or flexible learning option to which they can work independently on their modules at their own time and pace, with limited supervision from their teachers (Yazon et al., 2021; Salazar et al., 2021; Samortin et al., 2022; Beruin, 2022). From these, it is highly recommended that future studies should investigate the causality between leniency and grade inflation, as well as the possible role that academic dishonesty had played to validate or invalidate such assumption.

On the other hand, rational choice theory emphasizes that man is a rational being capable of taking actions by maximizing the benefit while limiting the cost of such action (Akers, 1990). Under this assumption, DiPietro (2010) described academic dishonesty as a result of a cost-benefit analysis, leaning towards the importance of favorable outcome/s (i.e., better test scores, passing the subject/course) rather than possible punishment for committing such acts. The pressure to get good grades, specifically due to parents' or family expectations, referred to as home environment Cardina and colleagues (2022), remained a key motivating factor for academic dishonesty (Aguilar M. G., 2021; Cardina et al., 2022). Similarly, the fear of failure in terms of grade expectations or college degree acceptance was observed to be one of the major reasons for cheating among college students (Revilla & Libre, 2022). In this case, the possibility of no punishments may warrant students to conduct cheating of various forms.

Neutralization Theory on Academic Dishonesty

Neutralization theory refers to justifications that an individual offers for doing a deviant behavior to negate the blame or culpability for such actions (Maruna & Copes, 2005). According to DiPietro (2010), despite the act being morally wrong, students engage in academic dishonesty by justifying the motivations behind their actions. Simply put, students provided reasons (or excuses) to justify why they committed academic dishonesty and became morally neutral on said deviant behavior. Storch and colleagues (as cited in DiPietro, 2010), described four neutralization techniques used by students, the first of which was that justifying academic dishonesty due "to being influenced by circumstances beyond their control", in this case, the effects of global pandemic on

various aspects of human life. According to Cardina and colleagues (2022), external factors in the form of environmental influences affect student motivation in performing academic dishonesty. This consists of pressure, opportunity to commit such acts, and normalization of academic dishonesty. In terms of pressure, it was cited that peer pressure, as well as pressure brought about by many assignments to accomplish within a certain period. Such are in line with San Jose's (2022) study that revealed the influence of peer involvement and Aguilar's (2021) study that revealed how peer influences served as a influencing factor for academic dishonesty, specifically in the form of academic servicing. The pressure brought about by their overwhelming number of academic workloads was also recounted as another reason for committing academic dishonesty (Aguilar M. G., 2021; Pagaddu, 2021). In terms of opportunity, the theory of planned behavior in the succeeding section provided a clearer application of such a factor. As for normalization of academic dishonesty, existing literature during the pandemic did not highlight similar findings. However, pre-pandemic studies cited that the students engaged in academic dishonesty, particularly in the tertiary level, viewed cheating as normal (Balbuena & Lamela, 2015; Diego, 2017; Gutierrez & Padagas, 2019).

The second neutralization technique was to deny the consequences of academic dishonesty, as it was a victimless crime and the third one redirecting the blame to authorities, specifically teachers or professors, for administering difficult assessments. However, current literature provided no similar assumptions or data to back both techniques' relevance to the Philippine setting during the pandemic. As a point of contention, the surge in academic servicing motivated by the opportunity for additional income and helping struggling students may be considered as a morally counterpoint to neutralize a students' decision to commit academic dishonesty. The last technique refers to "invoking a more compelling value system" as the basis for justification. The prime example provided by DiPietro (2010) was the value that one designates to helping their peers over the consequences of committing academic dishonesty. This was highly evident with the creation of the "Online Kopyahan" Facebook community page that supposedly promoted bayanihan or cooperation amongst students (Perez, 2021). Moreover, pre-pandemic study by Diego (2017) also emphasized the critical role that friendships play in motivating such behavior among students.

Planned Behavior Theory on Academic Dishonesty

The theory of planned behavior emphasized how an individual's action is dependent on one's intention and ability to act upon it (LaMorte, 2019). According to Ajzen (1969, as cited in DiPietro, 2010), academic dishonesty, under this theory, is a result based on students' intention to commit such acts driven by the opportunities present in each situation. A clear example here is cheating during exams taken online or at home due limited to no supervision from teachers, an act of academic dishonesty that was likely prevalent during the pandemic, as emphasized by Estrellado (2021), Frigillano (2021), and Beruin (2022)While this may be out of teachers' or a school's authority, the lack of oversight to students' behavior online enabled an opportunity to create a Facebook community page that proliferated such behavior. As reported by Bautista (2021), it was not until that Facebook community page became an online controversy that the government took necessary preventive measures. In addition, San Jose (2022) cited that the leniency in the form of allowing delayed submission due to pandemic-related excuses were presumed to encourage possible misconducts. More importantly, the use of technology, through various digital tools or applications, breed opportunities for students to commit academic dishonesty (Cruz et al., 2021; Frigillano, 2021; Revilla & Libre, 2022). Consequently, the nature of both online and modular learning setup afforded students to accomplish exams and assessment independently within set deadlines, of which such a situation provides opportunity for students to commit forms of academic dishonesty to attain a passing score/grade.

Academic Dishonesty as Ignorance or Confusion on Teacher's Expectations

According to DiPietro (2010), under this approach, academic dishonesty was brought about by unarticulated and unclarified expectations among teachers and their students. These expectations can be in the form of unclear explanations of the school/university code of conduct and its subsequent punishments or even ambiguous task guidelines/instructions which may invite interpretations. As mentioned by Frigillano (2021), covert collaborations among students to accomplish individual projects was a primary reason for academic dishonesty. There is the possibility that the teacher's lack of strict instructions in undertaking such a task/project allowed the possibility of such collaboration. This assumption can be a point of concern since according to Moralista and Oducado (2020), one of key concerns of teachers/professors going into the pandemic school year was what the limitations of depersonalized instructions will entail to teacher-student interactions. On the other hand, poor student-teacher communication was also a key concern among students that further affected their learning experience (Baticulon et al., 2020; Aguilar M. G., 2021; Aguilar et al., 2021; Jaca, 2022). Future research can investigate more on this topic to further clarify its validity in the current context.

Academic Dishonesty as Learned Behavior

In terms of the learned behavior approach, DiPietro (2010) emphasized how academic dishonesty as behavior is something that is reinforced by the environment where the student was socialized. Simply, if the school or university tolerates any forms of academic dishonesty, leaning towards allowing such culture, then such acts are likely to proliferate among its student population. As previously mentioned, pre-pandemic-related studies had already provided an insight to normalization of cheating, plagiarism, and similar misconducts (see Balbuena & Lamela, 2015; Diego, 2017; Gutierrez & Padagas, 2019). While there are no clear indications of the school environment allowing a culture of academic dishonesty during the pandemic, the role that social media played in the creation and proliferation of cheating, as evidenced by the Facebook community page controversy must be accounted for and as mentioned by Aguilar (2021), that of academic servicing social media groups or pages.

Academic Dishonesty as a Coping Strategy in a Stressful Environment

Lastly, one of the approaches enumerated by DiPietro (2010) was how academic dishonesty was observed as students' coping strategy to their stressful environment. Jaca (2022) explained how learning experiences during an ongoing global pandemic was a primary source of stress that affected students. Students felt that online learning setup was more tedious while their supposed learning environment was unconducive and full of distractions that hampered their focus. Academic-induced stress was also prevalent in modular learning setup as cited by Espina and Monte (2022). Barrot's (2021) study emphasized that the learning environment proved to be a greater challenge affecting students' learning process. A poor learning space within any household adversely affects students' motivation and well-being. Such a situation, under this approach, necessitated a student to commit cheating of any form as a means to get by these past two pandemic school years. On top of this, DiPietro (2010) highlighted how pressure to get good grades also drove students to commit academic dishonesty, a narrative that is already prevalent within context of focus (see Aguilar, 2021; Pagaddu, 2021; Cardina et al., 2022; San Jose, 2022).

Conclusions

This review paper highlighted the results presented by several studies on academic dishonesty in the Philippines during the pandemic. As the Philippines ventures in a blended learning modality for both basic education and tertiary level, the exploits of students explained here remain an important concern within the educational sphere. By outlining the possible internal (laziness or procrastination, lack of proper time management, fear of failure, poor learning capability, motivation, state of mental health, self-attitude, capability, and intention) and external influencing factors (peer involvement, overwhelming academic workload, difficulty of subject/course, Limited assistance of teachers, parental expectations, and use of digital technology) based on existing literatures and current approaches to academic dishonesty (deterrence theory, rational choice theory, neutralization theory, planned behavior theory, as ignorance or confusion on teacher's expectations, as learned behavior, and as coping strategy to stressful environment), this study serves as reference point for researchers in further investigating the extent of academic dishonesty in the country.

As for teachers, school administrators, and policymakers, findings detailed here can be utilized to craft better solutions to limit or even eliminate forms of academic dishonesty within their educational institutions. Within the context of academic dishonesty, it is crucial to reiterate the role the educational institutions and their personnel in upholding academic integrity within the confines of an online or modular learning environment, primarily through constant re-orientation and enforcement of school policies and code of conduct (San Jose, 2022). In addition, future studies can investigate the validity of the data revealed here, applied across various levels of education and both blended modular and blended online learning setups.

Conflict of interest

The author declares that he has not any conflict of interest in the conduct of this study.

References

Baticulon, R. E., Alberto, N. R., Baron, M. B., Mabulay, R. E., Rizada, L. G., Sy, J. J., . . . Reyes, J. C. (2020). Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *medRxiv*. https://doi.org/10.1101/2020.07.16.20155747

Fabito, B. S., Trillanes, A. O., & Sarmiento, J. R. (2020). Barriers and Challenges of Computing Students in an Online Learning Environment: Insights from One Private University in the Philippines. *International Journal of Computing Sciences Research, 5*(1), 441-458. https://doi.org/10.25147/ijcsr.2017.001.1.51

Barrot, J., Llenares, I., & del Rosario, L. (2021). Students' online learning challenges during the pandemic and how they cope with them: The case of the Philippines. *Educ Inf Technol,* 26, 7321-7338. https://doi.org/10.1007/s10639-021-10589-x

Hidalgo, J. L., Cadavis, J. C., Matienzo, A. L., Lanzarrote, K. K., & Rosario, E. M. (2021). A Phenomenological Study on Online Learning Set-up: Challenges and Coping Mechanisms of Senior High Students. *International Journal of Research Publications, 91*(1), 114-123. https://doi.org/10.47119/IJRP1009111220212580

Salazar, J. M., De Leon, J. P., & Legaspi, O. M. (2021). Experiences on Distance Learning of Selected Undergraduate Students of De La Salle University - Dasmariñas. Academia Lasalliana J*ournal of Education and Humanities(Special Issue),* 43-55. Retrieved from https://www.researchgate.net/publication/358975891_Experiences_on_Distance_Learning_of_Selected_Undergraduate_Students_of_De_La_Salle_University_-_Dasmarinas_COVID_Creases_A_Curriculum_in_Crisis_Special_Issue_in_Academia_Lasalliana_Journal_of_Educatio

Aguilar, M. G. (2021). Academic Dishonesty in the Philippines: The Case of 21st Century Learners and Teachers. I*nternational Journal of Management, Technology, and Social Sciences, 6*(1), 306-313. https://doi.org/10.5281/Zenodo.5091613

Espina, A. L., & Monte, R. J. (2022). Academic experiences of shs learners studying english in distance modular approach: A phenomenological study. *Electronic Journal of Education, Social Economics and Technology, 3*(1), 8-14.

Jaca, C. A. (2022). State University Students' Learning Locations and Remote Learning Challenges During the COVID-19 Pandemic. *International Journal of Learning, Teaching and Educational Research, 21*(2), 195-210. https://doi.org/10.26803/ijlter.21.2.11

Manalo, F. K., Reyes, V. P., & Bundalian, A. M. (2022). Challenges and opportunities in online distance learning modality in one public secondary school in the philippines. *IOER International Multidisciplinary Research Journal, 4*(1), 89-99.

Meniano, K. R., & Tan, R. G. (2022). Challenges in Studying Mathematics Using Self-Learning Module During COVID-19 Pandemic. *American Journal of Educational*

Research, 10(4), 182-187. https://doi.org/10.12691/education-10-4-4

Aguilar, M. V., Lineses, E. F., Mazo, R. M., & Ruben, R. L. (2021). A Year After: Online Learning Experiences of the Students of Social Sciences. *Academia Lasalliana Journal of Education and Humanities (Special Issue),* 15-27. Retrieved from https://www.researchgate.net/profile/Maria-Virginia-Aguilar/publication/357336081_A_Year_After_Online_Learning_Experiences_of_the_Students_of_Social_Sciences_COVID_Creases_A_Curriculum_in_Crisis_Special_Issue_in_Academia_Lasalliana_Journal_of_Education_an

Rotas, E., & Cahapay, M. (2021). From stress to success: Exploring how Filipino students cope with remote learning amid COVID-19 pandemic. *Journal of Pedagogical Sociology and Psychology, 3*(1). https://doi.org/10.33902/JPSP.2021366608

Moralista, R. B., & Oducado, R. M. (2020). Faculty Perception toward Online Education in a State College in the Philippines during the Coronavirus Disease 19 (COVID-19) Pandemic. *Universal Journal of Educational Research, Horizon Research Publishing Corporation (HRPUB), 8*(10), 4736-4742. https://doi.org/10.13189/ujer.2020.081044

Pagaddu, J. V. (2021). The Gender Dimension of Plagiarism: A Case Study. *International Journal of English Literature and Social Sciences, 6*(1), 263-265. https://doi.org/10.22161/ijels

Lopena, G. L., Padilla, N. D., & Madrigal, D. V. (2021). Walking through a maze: The struggles of accountancy students with online learning in the context of the COVID-19. Philippine Social Science Journal, 4(3), 30-38.

Frigillano, S. D. (2021). Prevalent Academic Cheating Practices Among Pre-Service Teachers. *International Journal of English Language Studies, 3*(7), 5-14. https://doi.org/10.32996/ijels

Beruin, L. C. (2022). STEM students conceptions of online learning during COVID-19 pandemic: A phenomenographic study. *Journal of Pedagogical Research,* 4. https://doi.org/10.33902/JPR.202217716

Galang, A., Conde, R., & Sudarsana, I. (2021). Mga kwento ng guro at kwentong mag-aaral: student assessment processes, challenges and solutions In the New Normal Setup Leading To Quality Assurance Inputs. J*urnal Penjaminan Mutu, 7*(2), 171-187.

Balba, J. C., & Caingcoy, M. E. (2021). Self-Concept of College Students: Empirical Evidence from an Asian Setting. *Technium Social Sciences Journal,* 24, 26-37.

Alvarez, H., Dayrit, R., Dela Cruz, M., Jocson, C., Mendoza, R., Reyes, A., & Salas, J. (2022). Academic dishonesty cheating in synchronous and asynchronous classes: A proctored examination intervention. *International Research Journal of Science, Technology, Education, and Management, 2*(1), 110-122. https://doi.org/10.5281/zenodo.6496807

Bautista, R. M., & Pentang, J. T. (2022). Ctrl C + Ctrl V: Plagiarism and Knowledge on Referencing and Citation among Pre-service Teachers. *International Journal of Multidisciplinary: Applied Business and Education Research, 3*(2), 245-257. https://doi.org/10.11594/ijmaber.03.02.10

Pandan, M. V., & Lomibao, L. S. (2022). Integrity of Mathematics Classroom Assessment in the New Normal. *American Journal of Educational Research, 10*(5), 282-287. https://doi.org/10.12691/education-10-5-3

Revilla, R. J., & Libre, L. J. (2022, April 25). Academic Dishonesty: 'An Intervention on Online Cheating in Administering Test Utilizing Quipper in BSED Science Sophomores. *SSRN Electronic Journal.* https://doi.org/10.2139/ssrn.4093176

San Jose, A. E. (2022). Academic Integrity of Students during the COVID-19 Pandemic: A Mixed Method Analysis. *European Journal of Education and Pedagogy, 3*(4), 97-103. https://doi.org/10.24018/ejedu.2022.3.4.400

Cardina, Y., Kristiani, & Sangka, K. B. (2022). Qualitative Survey of Academic Dishonesty on Higher Education: Identify the Factors and Solutions. *Journal of Positive School Psychology, 6*(3), 8705-8719.

Yang, S. C., Chiang, F. K., & Huang, C. L. (2017). A comparative study of academic dishonesty among university students in Mainland China and Taiwan. Asia Pacific Education Review, 18(3), 385-399. https://doi.org/10.1007/s12564-017-9497-2

Magsambol, B. (2021a, February 2). In remote learning, some students pay someone else to do their classwork. Retrieved August 29, 2022, from Rappler.com: https://www.rappler.com/newsbreak/investigative/students-paying-someone-else-do-classwork-remote-learning-setup/

Magsambol, B. (2021b, March 5). *DepEd probes academic dishonesty in distance learning.* Retrieved August 29, 2022, from Rappler.com: https://www.rappler.com/nation/deped-probes-academic-dishonesty-in-distance-learning/

Perez, A. J. (2021, December 5). *Bayanihan or kopyahan? The rise of online academic cheating groups.* Retrieved August 29, 2022, from Sunstar.com.ph: https://www.sunstar.com.ph/article/1915055/davao/local-news/bayanihan-or-kopyahan-the-rise-of-online-academic-cheating-groups

Noriega, R. (2022, March 2). *CHED to continue flexible learning as a policy for HEIs.* Retrieved August 29, 2022, from GMAnetwork.com: https://www.gmanetwork.com/news/topstories/nation/823703/ched-to-continue-flexible-learning-as-a-policy-for-heis/story/

Patag, K. J. (2022, July 20). *Marcos pushes for limited blended learning for coming school year.* Retrieved August 29, 2022, from Philstar.com: https://www.philstar.com/headlines/2022/07/20/2196736/marcos-pushes-limited-blended-learning-amid-deped-order-mandating-100-face-face-classes

Paré, G., & Kitsiou, S. (2017). *Methods for literature reviews. In Handbook of eHealth Evaluation: An Evidence-based Approach* [Internet]. University of Victoria.

Levy, Y., & Ellis, T. J. (2006). A systems approach to conduct an effective literature review in support of information systems research. *Informing Science,* 9.

Balbuena, S. E., & Lamela, R. A. (2015). Prevalence, Motives, and Views of Academic Dishonesty in Higher Education. *Asia Pacific Journal of Multidisciplinary Research, 3*(2), 69-75.

Diego, L. A. (2017). Friends with Benefits: Causes and Effects of Learners' Cheating Practices During Examination. *IAFOR Journal of Education, 5*(2), 121-138. https://doi.org//10.22492.ije.5.2.06

Gutierrez, R., & Padagas, R. (2019). Unveiling a Painpoint in a College Classroom: College Students' Perceptions of

Academic Dishonesty and Some Tests of Correlations. *Universal Journal of Educational Research, 7*(12), 2634-2641. https://doi.org/10.13189/ujer.2019.071210

Ditona, G. D., & Rico, F. M. (2021). Reading Level of Grade II Pupils Scaffolding for Reading Program of Eastern Schools in Botolan District, Philippines. *American Journal of Humanities and Social Sciences Research, 5*(8), 86-94.

De Guzman, C. (2021, December 1). *The Philippines Still Hasn't Fully Reopened Its Schools Because of COVID-19. What Is This Doing to Children?* Retrieved August 29, 2022, from Time.com: https://time.com/6124045/school-closures-covid-education-philippines/

Šprajc, P., Urh, M., Jerebic, J., Trivan, D., & Jereb, E. (2017). Reasons for Plagiarism in Higher Education. *Organizacija, 50*(1), 33-45. https://doi.org/10.1515/orga-2017-0002

Adonis, M. (2020, October 12). *Students overwhelmed by tasks under 'new normal' way of learning.* Retrieved August 29, 2022, from Inquirer.net: https://newsinfo.inquirer.net/1346453/students-overwhelmed-by-tasks-under-new-normal-way-of-learning

Hernando-Malipot, M. (2021, May 3). *Too tired to teach, too tired to learn: Teachers, students bear the brunt of distance learning.* Retrieved August 29, 2022, from Manila Bulletin: https://mb.com.ph/2021/05/03/too-tired-to-teach-too-tired-to-learn-teachers-students-bear-the-brunt-of-distance-learning/

Cabreza, V. (2021, November 4). *Baguio schools eye shortbreaks to ease academic stress.* Retrieved August 29, 2022, from Inquirer.net: https://newsinfo.inquirer.net/1510128/baguio-schools-eye-shortbreaks-to-ease-acad-stress

Hernando-Malipot, M. (2022, January 10). *DepEd, CHED urged to implement nationwide academic ease amid a surge in COVID-19 cases.* Retrieved August 29, 2022, from Manila Bulletin: https://mb.com.ph/2022/01/10/deped-ched-urged-to-implement-nationwide-academic-ease-amid-a-surge-in-covid-19-cases/

Dangle, Y., & Sumaoang, J. (2020). The implementation of modular distance learning in the Philippine secondary public schools. *3rd International Conference on Advanced Research in Teaching and Education.* Retrieved from https://www.dpublication.com/wp co ntent/uploads/2020/11/27 427.pdf

Pinar, F. I. (2021). Grade 12 Students' Perceptions of Distance Learning in General Chemistry Subject: An Evidence from the Philippines. *International Journal of Theory and Application in Elementary and Secondary School Education, 3*(1), 44-61. https://doi.org/10.31098/ijtaese.v3i1.509

Robledo, D. A., Catapang, E., Motin, A., & Maalihan, E. (2021). Teaching Beyond Borders: Effectiveness of Heuristic Approach in Teaching Science in Public Secondary Schools in Area IV, Division of Batangas, Philippines. *International Engineering Journal For Research & Development, 6*(2), 1-13. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3839132

Nabayra, J. N. (2022). Least Mastered Topics in Mathematics and Freshmen Students' Perception of Mathematics Learning in the New Normal from a State University in the Philippines. *Journal of Positive School Psychology, 6*(6), 280-289.

Cruz, J. T., Cruz, J. J., Cruz, J. P., & Cruz, J. R. (2021). Optimizing Legal Education through Technology-Driven Pedagogy. *International Journal of Learning and Teaching, 7*(1), 48-53. https://doi.org/10.18178/ijlt.7.1.48-53

Akers, R. L. (1990). Rational Choice, Deterrence, and Social Learning Theory in Criminology: The Path Not Taken. *J. Crim. L., 81*(3), 653-676. Retrieved from https://scholarlycommons.law.northwestern.edu/cgi/viewcontent.cgi?article=6670&context=jclc

DiPietro, M. (2010). Theoretical Frameworks for Academic Dishonesty: A Comparative Review. *To Improve the Academy: A Journal of Educational Development,* 28. https://doi.org/10.3998/tia.17063888.0028.018

CHED. (2020, March 17). *Chairman's Statement.* Retrieved August 29, 2022, from Commission on Higher Education: https://ched.gov.ph/chairmans-statement/

Cervantes, F. M. (2020, September 30). House adopts reso on automatic passing mark for K-12 students. Retrieved August 29, 2022, from Philippine News Agency: https://www.pna.gov.ph/articles/1155247

David, R. (2022, July 24). *The phenomenon of 'grade inflation'.* Retrieved August 29, 2022, from Inquirer.net: https://opinion.inquirer.net/155366/the-phenomenon-of-grade-inflation

Gascon, M. (2021, March 4). *99% of students got passing marks? Senators doubt DepEd report.* Retrieved August 29, 2022, from Inquirer.net: https://newsinfo.inquirer.net/1402754/99-of-students-got-passing-marks-senators-doubt-deped-report

Magsambol, B. (2021c, March 5). *DepEd: 99% of students got passing marks because teachers were 'considerate'.* Retrieved August 29, 2022, from Rappler.com: https://www.rappler.com/nation/deped-report-students-got-passing-marks-teachers-considerate/

Yazon, A. D., Briones, M. R., & Callo, E. C. (2021). Correlational Study on the Contextual Factors Influencing The Effectiveness of Flexible Learning: The Case of One State University in the Philippines. *International Journal of Management, Entrepreneurship, Social Science and Humanities, 4*(2), 146-156. https://doi.org/10.31098/ijmesh.v4i2.671

Samortin, M. B., Corcuera, L. C., Alvarez, A. V., & Palmero, H. R. (2022). Education and the Pandemic: Examining Students' Remote Learning Experiences in the Philippines. *International Journal of Scholars in Education, 5*(1), 1-13. https://doi.org/10.52134/ueader.1064312

Maruna, S., & Copes, H. (2005). What Have We Learned from Five Decades of Neutralization Research? *Crime and Justice,* 32, 221-320. https://doi.org/10.1086/655355

LaMorte, W. W. (2019, September 9). *The Theory of Planned Behavior.* Retrieved August 29, 2022, from Boston University School of Public Health: https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/BehavioralChangeTheories3.html

Ajzen, I. (1969). The prediction of behavior intentions in a choice situation. *Journal of Experimental Psychology, 5*(4), 400-416.

Estrellado, C. J. (2021). Transition to Post-Pandemic Education in the Philippines: Unfolding Insights. International *Journal of Scientific and Research Publications, 11*(12).

Bautista, J. (2021, September 23). *DepEd eyes pact with parents vs online cheating among pupils.* Retrieved August 29, 2022, from Inquirer.net: https://newsinfo.inquirer.net/1491613/deped-eyes-pact-with-parents-vs-online-cheating-among-pupils

ФАКТОРИ ВПЛИВУ НА ПРОБЛЕМУ АКАДЕМІЧНОЇ НЕДОБРОЧЕСНОСТІ ТА СУЧАСНІ ПІДХОДИ ДО ЇЇ ВИРІШЕННЯ НА ФІЛІППІНАХ ПІД ЧАС ПАНДЕМІЇ COVID-19: ОГЛЯД

Лоуренс К. Беруін

Університет Філіппін Лос Баньос

Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 9 с., 62 джерела.

Мета дослідження. Тоді як у школах на Філіппінах розпочинається новий навчальний рік, переважною проблемою в академічному середовищі залишається академічна недоброчесність. Щоб представити огляд цієї ситуації, було створено цю оглядову статтю з метою надання актуальної інформації про стан проблеми академічної недоброчесності шляхом: 1) визначення факторів впливу та 2) застосування сучасних підходів до вирішення проблеми академічної недоброчесності.

Матеріали та методи. Використовуючи огляд наявної літератури, у цьому дослідженні були описані можливі внутрішні (лінощі або зволікання, нераціональне планування свого часу, страх зазнати невдачі, знижений рівень здатності до навчання, слабка мотивація, незадовільний стан психічного здоров'я, низька самооцінка, низький рівень здібностей і невисокий рівень прагнень) і зовнішні фактори впливу (причетність однокласників, непомірне навчальне навантаження, складність предмета/курсу, обмежена допомога вчителів, очікування батьків і використання цифрових технологій) та сучасні підходи до вирішення проблеми академічної недоброчесності (теорія стримування, теорія раціонального вибору, теорія нейтралізації, теорія запланованої поведінки, наприклад, незнання або нерозуміння очікувань учителя, набута поведінка та стратегія подолання для середовища, яке викликає стрес), які слугуватимуть відправною точкою для дослідників під час дослідження масштабів академічної недоброчесності в країні.

Результати та висновки. Аналогічно, результати цього дослідження можуть допомогти вчителям, адміністративному персоналу шкіл та особам, які визначають політики, створювати ефективніші рішення для обмеження або усунення форм академічної недоброчесності в закладах освіти.

Ключові слова: академічна недоброчесність, дистанційне навчання, модульне навчання, пандемія, філіппінська освіта.

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Please evaluate the following aspects of the article: (If the answer is "No", please make your improvements in the field "Information for authors", if applicable)

- Does the title accurately reflect the content of the text?
- Is the aim of the review clearly stated?
- Does this article make a significant contribution to the development of this problem?
- Is the article sufficiently complete and up-to-date?
- Is the article clearly written (concise, clear and well organised)?
- Is the essence of the article covered in the abstract? Is the abstract informative and concise?
- Are the author's conclusions adequately supported by references?

Please provide specific comments and suggestions, particularly on the layout, title, description, introduction, hypothesis and/or subject of study, materials and methods, statistical processing of materials, results, discussions, conclusions, language and references.

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