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ZONATION SYSTEM IN ADMISSION OF NEW STUDENT AT STATE SECONDARY SCHOOL IN INDONESIA: HOW PREDICTABLE TO LEARNING SUCCESS

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Abstract. *Introduction*. A new student acceptance model with the zoning system raises various problems, including the unequal number of public schools in an area causing students to experience barriers to obtaining a proper education. The decrease in motivation and achievement of students is because the selection is only based on zoning, and the achievements of prospective students at the previous education level are not considered. Students fail to enter superior schools because they are outside the zone. The distribution of quality public schools are not evenly distributed, causing limited choices and causing the implementation of the principle of justice in access to education services – lack of readiness of local governments in setting zones.

Aim. From the problems above, this study *aims* to find differences in learning achievement in terms of admission, predict learning achievement from elementary school to junior high school, and determine graduation document predictions with a zoning system on student achievement.

Research methodology and methods. The research used a quantitative approach from October 2021 to March 2022. The research sample was 356 students who entered the 2018 state junior high school and graduated from the 2020 school year junior high school. The sampling technique for this study used proportional random sampling. Determining the size of the research sample was done by considering the pathways for accepting new students: the zoning path, the achievement path, the affirmation path, and the parent transfer path. Data analysis used ANOVA and multiple regression analysis at a significance level of 5%.

Results and scientific novelty. The results showed no difference in the average report cards of junior high school students when viewed from the path when they entered the junior high school through the zoning system. The results of one-way ANOVA obtained F = 1.298 with a significance level of 0.275. The differences in the entry paths of students to junior high school, namely from the zoning pathway, academic and non-academic achievement pathways, affirmation pathways, and parental transfer paths, are proven not to affect their learning achievement in junior high schools. There is a linear regression from students' learning achievement in elementary school to students' learning achievement in junior high school. The partial and simultaneous tests show that it is not proven that learning achievement in elementary school affects learning achievement in junior high school. When they graduate from elementary school, students' learning achievement has a weak predictive power on students' learning achievement in junior high school. The national primary school-based school examination average, elementary school report card average, and elementary school examination average, used as entry requirements to junior high school in the zoning system, only have a predictive power of 1.4–2,7%.

Practical significance. Parents can use this research to make decisions on their child's education. Parents do not need to worry about the zoning system implemented by the government in accepting new students because the zoning system does not affect children's achievements at the level of education they take. The school must also implement education systems and policies properly so that the quality of education in each institution is maintained so that parents do not worry about choosing a place for their child's education.

Keywords: zonation system, admission of a new student, learning success.

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СИСТЕМА ЗОНИРОВАНИЯ ПРИ ПРИЕМЕ НОВОГО УЧАЩЕГОСЯ В ГОСУДАРСТВЕННУЮ СРЕДНЮЮ ШКОЛУ В ИНДОНЕЗИИ: ПРЕДСКАЗУЕМОСТЬ УСПЕВАЕМОСТИ В УЧЕБЕ

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Аннотация. *Введение*. Новая модель приема учащихся, основанная на системе зонирования, вызывает различные проблемы, в том числе неравное количество государственных школ в районе, из-за чего учащиеся сталкиваются с препятствиями на пути к получению надлежащего образования. Происходит снижение мотивации и успеваемости учащихся, поскольку отбор осуществляется только на основе зонирования, а достижения учащихся на предыдущем уровне образования не учитываются. Абитуриенты не могут поступить в высшие школы, потому что они находятся за пределами зоны. Распределение качественных государственных школ неравномерно, что приводит к ограничению выбора и реализации принципа справедливости в доступе к образовательным услугам – неготовности органов местного самоуправления в установленных зонах.

Цель. Исходя из вышеперечисленных проблем, это исследование направлено на поиск различий в успеваемости при поступлении, прогнозирование успеваемости от начальной школы до неполной средней школы и определение прогнозов выпускных документов с помощью системы зонирования успеваемости учащихся.

Методология и методы исследования. В исследовании использовался количественный подход с октября 2021 года по март 2022 года. Выборку исследования составили 356 учащихся, поступивших в государственную неполную среднюю школу в 2018 году и окончивших неполную среднюю школу в 2020 учебном году. Для этого исследования была использована пропорциональная случайная выборка. Размер исследовательской выборки определялся посредством рассмотрения способов приема новых учащихся: по системе зонирования, на основе академических и неакадемических достижений, на основе подтверждения низкого экономическго статуса и на основе перевода родителей с постоянного места жительства на другое место работы по назначению. При анализе данных использовали дисперсионный анализ ANOVA и множественный регрессионный анализ при уровне значимости 5 %.

Результаты и научная новизна. Результаты не показали никакой разницы в средних табелях успеваемости учащихся младших классов средней школы, при поступлении в неполную среднюю школу через систему зонирования. По результатам одностороннего дисперсионного анализа получено значение F = 1,298 при уровне значимости 0,275. Доказано, что различия в способах поступления учащихся в неполную среднюю школу, а именно на основе зонирования, достижений, подтверждения и перевода родителей, не влияют на их успеваемость в неполных средних школах. Существует линейная регрессия от успеваемости учащихся в начальной школе к успеваемости учащихся в неполной средней школе. Частичное и паралелльное тестирования показывают, что не доказано, что успеваемость в начальной школе влияет на успеваемость в младшей средней школе. Когда учащиеся заканчивают начальную школу, их успеваемость имеет слабую прогностическую силу в отношении успеваемости в средней школе. Средняя оценка национального экзамена в начальной школе, средняя оценка в табеле начальной школы и средняя оценка экзамена в начальной

школе, используемые в качестве требований для поступления в неполную среднюю школу в системе зонирования, имеют предсказательную силу только в пределах от 1,4 % до 2,7 %.

Практическая значимость. Родители могут использовать это исследование для принятия решений об образовании своего ребенка. Родителям не нужно беспокоиться о системе зонирования, реализуемой правительством при приеме новых учеников, потому что она не влияет на достижения детей на уровне образования, которое они получают. Школа должна также осуществлять систему отбора обучающихся надлежащим образом, для того чтобы качество образования в каждом учебном заведении поддерживалось и родители не беспокоились о выборе места для обучения своего ребенка.

Ключевые слова: система зонирования, прием нового студента, успехи в обучении.

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SISTEMA DE ZONALIZACIÓN PARA LA ADMISIÓN DE NUEVOS ESTUDIANTES A LA ESCUELA SECUNDARIA PÚBLICA EN INDONESIA: PREVISIBILIDAD DEL RENDIMIENTO ACADÉMICO

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Abstracto. *Introducción*. El nuevo modelo de inscripción basado en la zonalización ha venido causando varios problemas, incluido el número desigual de escuelas públicas en el área, lo que hace que los estudiantes enfrenten barreras para recibir una educación adecuada. Hay una disminución en la motivación y el rendimiento de los estudiantes, ya que la selección se realiza únicamente sobre la base de la zonalización y no se tienen en cuenta los logros de los estudiantes en el nivel educativo anterior. Los solicitantes no pueden ingresar a escuelas superiores porque se encuentran fuera de la zona. La distribución de escuelas públicas de calidad es desigual, lo que conduce a una elección e implementación limitadas del principio de equidad en el acceso a los servicios educativos: la falta de preparación de los gobiernos locales en áreas designadas.

Objetivo. Basándose en las cuestiones anteriores, este estudio tiene como objetivo encontrar diferencias en el desempeño inicial, predecir el desempeño desde la escuela primaria hasta la escuela secundaria y determinar las predicciones de graduación utilizando un sistema de zonalización del desempeño estudiantil.

Metodología, métodos y procesos de investigación. El estudio utilizó un enfoque cuantitativo a partir de octubre de 2021 hasta marzo de 2022. La muestra del estudio estuvo compuesta por 356 estudiantes que ingresaron a la escuela secundaria pública en el año 2018 y se graduaron de la escuela secundaria en el año escolar 2020. Para este estudio se utilizó un muestreo aleatorio proporcional. El tamaño de la muestra del estudio se determinó considerando los métodos de admisión de nuevos estudiantes: basado en el sistema de zonalización, así como en los logros académicos y no académicos, en la verificación de estatus económico bajo y teniendo además como referencia las mudanzas de los padres de familia del lugar de residencia permanente a otra por cuestiones de la actividad laboral. Al analizar los datos, se utilizaron el ANOVA y el análisis de regresión múltiple con un nivel de significancia del 5%.

Resultados y novedad científica. Los resultados no mostraron diferencias en las boletines de calificaciones promedio de los estudiantes de secundaria cuando ingresaron a la escuela secundaria a través del

sistema de zonalización. Según los resultados del análisis de varianza unidireccional, se obtuvo un valor F de 1,298 con un nivel de significancia de 0,275. No se ha demostrado que las diferencias en la forma en que los estudiantes son admitidos en las escuelas secundarias, es decir, según la zonalización, el mérito, la confirmación de los padres y la transferencia, afecten su desempeño en las escuelas secundarias. Existe una regresión lineal desde el desempeño de los estudiantes en la escuela primaria hasta el desempeño de los estudiantes en la escuela secundaria. Las pruebas parciales y paralelas indican que no se ha demostrado que el rendimiento en la escuela primaria influya en el rendimiento en la escuela secundaria inferior. Cuando los estudiantes terminan la escuela primaria, su desempeño académico tiene poco poder predictivo sobre el desempeño en la escuela secundaria. El puntaje promedio nacional en los exámenes de la escuela primaria, la calificación promedio en el boletín de calificaciones de la escuela primaria y la calificación promedio en los exámenes de la escuela primaria utilizados como requisitos de ingreso a la escuela secundaria en el sistema de zonificación solo tienen un poder predictivo que oscila entre el 1,4% y el 2,7%.

Significado práctico. Los padres pueden utilizar esta investigación para tomar decisiones sobre la educación de sus hijos. Los padres no necesitan preocuparse por el sistema de zonalización implementado por el gobierno al admitir nuevos estudiantes porque no afecta el rendimiento de los niños en el nivel de educación que reciben. La escuela también debe implementar un sistema para seleccionar adecuadamente a los estudiantes de modo que se mantenga la calidad de la educación en cada institución educativa y los padres no se preocupen por elegir un lugar para que sus hijos estudien.

Palabras claves: sistema de zonalización, admisión del nuevo estudiante, éxito académico.

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Introduction

Education is not a foreign word, and every human being cannot be separated from the word education. Education has existed since humans have been on this earth, and education can be done in various ways [1]. Even babies still in the womb begin to recognise education from their mothers, although not directly. The importance of education in human life spurred UNESCO (United Nations, Educational, Scientific and Cultural Organisation) as a world educational institution to declare four pillars of education, namely (1) learning to know, (2) learning to do, (3) learning to live together, and (4) learning to be. According to UNESCO, the four pillars of education have deep meaning for education stakeholders. The four pillars are the objectives of the wider implementation of education. The four pillars of education are used as a benchmark for implementing education worldwide, including in Indonesia.

Since 2018 the acceptance of new students in Indonesia has used a new method, which refers to the regulation of the minister of education and culture number 17 of 2017, which was later amended to number 20 of 2019 concerning the acceptance of new students in kindergarten, elementary schools, junior high schools, high school, and vocational high school. The minister of education updated the regulation to become the regulation of the minister of cultural education of the Republic of Indonesia number 1 of 2021. Guided by the Minister of Education and Culture Regulation, the admission of new students to schools at all levels of education throughout

Indonesia is divided into four pathways: the zoning path, the achievement path, the affirmation path, and the parent transfer path. In the government regulations of the Republic of Indonesia, four models of student recruitment pathways are emphasised to ensure the implementation of the rights of every citizen to obtain quality and equitable education. This model also reduces the dichotomy between superior and non-performing schools [2].

Many problems were found when accepting new students, including the uneven number of public schools – reducing student motivation and achievement because the selection is only based on zoning, and the achievements of prospective students at the previous level of education are not considered. Students fail to enter superior schools because they are outside the zone [3], and the distribution quality of public schools is not evenly distributed, causing limited choices [4]. It causes the implementation of the principle of justice in education access services [5] and the lack of readiness of local governments in setting zones [6]. Problems were even found after the admissions process, including accepting those with low academic abilities and poor attitudes [7]. The problem of zoning causes public schools, in general, to prefer acceptance by achievement path to obtain better and guaranteed input [8]. Some parties suggest that the acceptance of new students based on zoning and age selection needs to be reviewed because it has reduced academic and non-academic learning achievements [9]. Descriptively, the average report card of students, who are accepted through the achievement path, is higher than those accepted through the zoning and affirmation pathways [10]. Previous research on the zoning system has proven that the acceptance of new students based on zoning and clusters is less useful pedagogically, economically, administratively, and politically [11].

Some of the problems stated above prove that the new student acceptance model still needs to be evaluated for its effectiveness. Most schools are not ready to implement it, so this model must continue to be evaluated to make it more effective. The new student acceptance model will affect the achievement of educational and learning goals in schools. The achievement of learning objectives in schools is reflected in the learning achievements achieved by students, the average report cards for each grade level and overall, and the final exam scores they get [12]. Ideally, the learning process in schools is considered successful if all students can achieve learning objectives with satisfactory grades, regardless of the path when they enter the school [13]. The basic question is whether the selection process using zoning, achievement, and affirmations has been able to predict student learning achievement.

A good selection process increases the quality of educational institutions, facilitates the development of students' potential according to their talents and interests, and facilitates a good learning process [14]. The selection process is part of an effective plan for students until they complete their education at school [15]. The selection process affects the quality of the output of educational institutions [16]. In addition, a good selection process in the acceptance of new students has a predictive function. The selection process is considered good if it can predict students' learning achievement in the future so that the process has strong predictive power.

Thus, the acceptance of new students is one of the important stages for the school because it determines its future success [17]. A good selection process should be able to predict student success.

Predictive validity is more related to the ability of measurement instruments in a selection to predict the success of selection participants in the future. In a broader sense, predictive validity can also be related to the ability of a selection process to predict future success. Predictive validity means the ability to predict future success [18]. Predictive validity is defined as the ability of the entry selection score to predict the success of learning achievement in the following years [19], the effectiveness of a predictor to predict future performance, the level of accuracy of an instrument or a selection process to predict future learning achievement [20]. In the context of the correlation between result test scores, predictive validity is represented by a coefficient representing the strength of the relationship between the selected data and future performance [21]. In the context of the sociology of education, selection functions to predict success and the problems that will be faced [22]. Tests and selection data can serve as predictors.

Meanwhile, students' success can be used with dichotomous or continuous criteria. The predictive power is represented by the coefficient of determination (R2) in correlation or regression. Predictive power can also be seen in how many predictors contribute to the criteria. Accepting new students is a selection process to enter a school. The provisions regarding accepting new students refer to several provisions, including minister of education and culture number 1 of 2021. These provisions explain that the acceptance of new students in Junior High Schools is through 4 pathways: zoning, affirmation, transfer of parental duties, and achievement. The quotas that are generally used for each path are the zoning path of at least 70% of the quota, the achievement path of 10%, the affirmation path of at least 15%, the transfer path of parental duties of a maximum of 5%, and the achievement path for unfulfilled quotas. In practice, determining this quota becomes more flexible due to the different environmental conditions the recipient junior high schools face, especially because of the provisions that use the words maximum or minimum.

Implementing new student admissions consists of five stages: (1) announcement of registration and acceptance of prospective new students at the school concerned is carried out openly; (2) registration of acceptance of prospective new students; (3) selection according to the registration path; (4) announcement of the determination of new students; and (5) re-registration of new students. Admission of new students through the zoning route is intended for students who live around the school within a 5 km radius. A family card or a domicile certificate issued at least a year earlier proves the domicile certificate. The affirmation pathway is intended for underprivileged prospective students, as evidenced by the participation of prospective students in social safety net programmes such as the smart Indonesia card or inclusion in the integrated social welfare data. The achievement path is intended for prospective students with academic and non-academic achievements. Meanwhi-

le, the parental transfer route is intended for prospective students outside the zoning but whose parents live in the zoning area around the school.

One of the important documents that prospective students must prepare is the elementary school graduation document. This requirement applies to all selection pathways. This document can be submitted in hard or soft copy. The graduation documents consist of elementary school diplomas, the national standard school examination results, report cards, and school exam data in elementary schools. When the prospective student graduates from elementary school, this document is minimally useful for: (1) administratively ensure that the selected participants for junior high school have graduated from elementary school; (2) graduation documents are used to describe prospective students' profiles and development. In this context, the scores that prospective students have obtained can be used as predictors and comparisons of their future learning achievements.

Methodology

The research was conducted on state junior high school students from October 2021 to March 2022. A sample of 356 people were taken proportionally randomly, the proportions determined in Indonesian new student admissions system, according to the proportion determined in the new student admissions system in Indonesia, namely 70% from the zoning route, 10% from the achievement path, 18% from the affirmation route, and 3% from the parent transfer route. The sample is students who enter junior high school in the 2019 school year and graduate from the same junior high school in the 2020 school year. The research framework is based on a quantitative approach [23, 24]. The research data used in this study are documents in the form of junior high school enrollment data, elementary student achievement data, and achievement data while in junior high school. The research variables included the average grades VII to grade IX of junior high school as a criterion (Y). Predictor one (X_1) is the achievement of studying at the national standard school examination during elementary school. The average elementary school report card scores is a predictor two (X_2), and the average school test is a predictor three (X_3). The analysis of research data was conducted using Analysis of Variance (ANOVA) and multiple regression analysis, with the help of SPSS for Windows [25]. This analysis tests several hypotheses: (1) Are there differences in student achievement in state junior high schools when viewed from the differences in the entry pathways to the zoning system?; (2) Is there a regression in the average national standardised school examination for elementary school (X_1), the average for elementary school report cards (X_2), and the average for elementary school examinations (X_3) on the average value of student report cards in junior high school. The significance criteria for hypothesis testing is 5% or .05. Meanwhile, the predictive power of the predictor (X) against the criterion (Y) is measured by the correlation coefficient R_{XY} and the coefficient of determination (R_2). The correlation coefficient can benchmark the strong association between X and Y.

Results

Differences in the Average Report Cards of Junior High School Students Based on the Path of Entry

The entry route for students to state junior high schools in this study is divided into zoning routes because their residence is still around the target school. This group is group 1 (G1), with the largest portion, which is 70% of students. Group 2 (G2) are students who enter junior high school through academic and non-academic achievements, with a portion of 10% of new students accepted. Group 3 (G3) are those who enter junior high school through the affirmation route, mainly because they come from low-income families, with a proportion of 18%. Meanwhile, group 4 (G4) are those who enter junior high school because their parents moved to locations around the targeted junior high school, with a proportion of 3%. Descriptively, the average report cards of junior high school students from class VII to class IX in each group are illustrated in Table 1.

Table 1

Descriptive description of the average report cards of junior high school students based on the path of entry

Entry path	Average report card	Standard deviation
G1	78.73	1.72
G2	79.24	1.48
G3	78.55	1.67
G4	78.80	1.67

The analysis of Table 1 shows that descriptively, the average student report cards for grades from class VII to class IX of junior high school are not too different when viewed based on their entry path. This result means that the average grades of report cards for G1, G2, G3, and G4 are not descriptively different. The analysis of variance between groups tends to be homogeneous, as evidenced by Levene's test of 0.573 and a significance level of 0.633. The results of the ANOVA analysis above obtained the value of F = 1.298 with a significance of .275 > .05, so it is concluded that in the population of junior high school students and a significance level of .05 or 5%, there is no difference in the average report cards of junior high school students. When viewed from the path when they entered junior high school, in other words, the average student report cards in groups G1, G2, G3, and G4, did not show a significant difference. Thus, the different paths when students enter junior high school do not cause differences in their average report cards.

Regression of Some Predictors Against Criteria

In this study, the predictors used were the average of the elementary school national standardised school exams (X_1), the average elementary school report cards (X_2), and the average elementary school exams (X_3). Some of these predictors predict student achievement in junior high school. Students learning achievement in junior

high school is represented by the average report cards of junior high schools, namely from report cards when students were in class VII to class IX. The regression of each predictor against the criteria is as follows:

The average regression of the national standard school examination for elementary school (X_1) against the average first middle school report card (Y).

In this case, the Linear regression model is taken, which is considered easier to explain. The linear regression model in the population is assumed through the equation $\hat{Y} = \beta_0 + \beta_1 X_1 + \varepsilon$, while the sample is represented by the equation $Y = b_0 + b_1 X_1$. This model symbolises the influence of X_1 on Y. Based on the results of testing using Linear regression analysis, the following figures of test results are obtained:

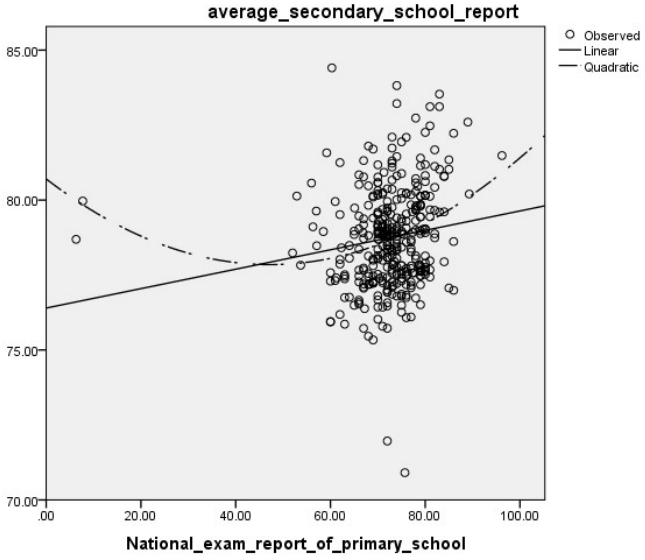

Fig. 1. Regression pattern of X_1 against Y

ANOVA statistical analysis obtained the value of F = 8.449 with a significance of 0.004 < 0.05. The ANOVA analysis results show linear regression in the value of the national standard school examination for elementary schools (X_1) with an average report card. Elementary school national examination scores (X_1) affect the middle school average report cards (Y), so elementary school national examination scores can be used to predict the average report cards. The linear regression equation in the sample is described by the coefficients b_0 and b_1 (Table 2).

Table 2

Linear regression coefficient X_1 against Y

Elementary school national standardised school examination	Unstandardised coefficients		Standardised coefficients	T	Sig.
	B	Std. Error	Beta		
	.001	.000	.151	2.880	.004
(Constant)	76.436	.790		96.795	.000

Statistical analysis results obtained coefficients b0 = 76,436 and b1 = .001. Thus, the regression equation for the elementary school national standardised school examination scores (X_1) sample to the average junior high school report cards (Y) is Y = 76,436 + .001X_1. This equation can predict the grades of report cards for junior high school students if the elementary school national standardised school examination grades are known when they enter junior high school, regardless of the entry route. Analysis of the coefficient of determination X_1, against Y, the coefficient R_2 = .023 or 2.3% is obtained. This analysis means that the average value of the elementary school national standard school examination (X_1) can only predict the average value of report cards or student learning achievements in junior high schools of 2.3%. The remaining 97.7% is influenced by other factors not examined in this study.

The average regression of elementary school report cards (X_2) to the average junior high school report cards (Y)

Linear or quadratic models can also approximate regression X_2 to Y. In this case, linear regression is taken, with the model equation = 0 + 1X_2 + in the population and the equation Y = b_0 + b1X_2 in the sample. Based on the test results using linear regression analysis, the following image is obtained:

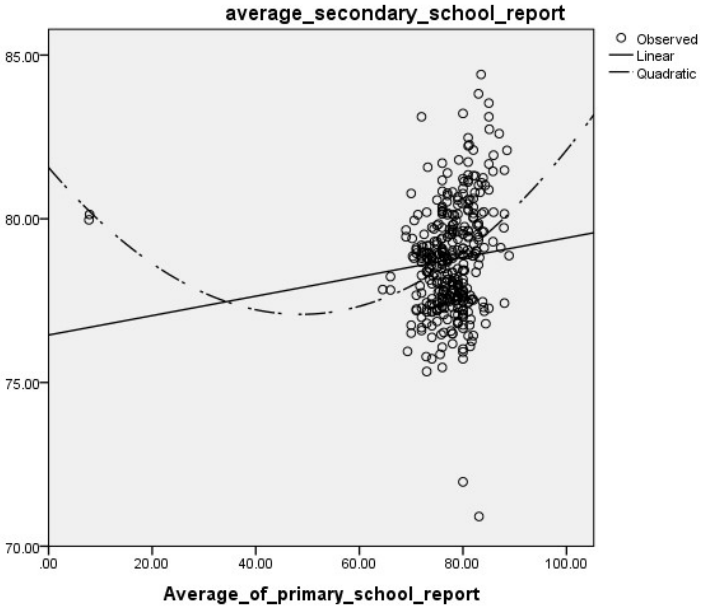

Fig. 2. Regression pattern of X_2 against Y

The analysis of ANOVA X_2 against Y obtained F = 4.936 with a significance of 0.027 < 0.05. The results of the analysis can be understood that there is a linear regression of the average elementary school report card (X_2) on the average junior high school student report card so that X_2 affects Y. The average elementary

school report cards (X_2) can predict student achievement in junior high schools. The linear regression coefficient analysis of X_2 against Y obtained a coefficient of $b_0 = 76.450$ and $b_1 = .030$. From the results of the regression analysis that has been carried out, the regression equation is Y = 764.450 +.030. This equation can predict the grades of junior high school students report cards if the average elementary school report cards are known when they enter junior high school, regardless of their entry route. The analysis results show that the coefficient of determination R_2 represents the magnitude of the influence of X_2 on Y. The analysis of the coefficient of determination of X_2 on Y obtained $R_2 = 0.014$ or 1.4%. In other words, the average value of elementary school report cards (X_2) can only predict the average value of report cards or student achievement in junior high school by 1.1%. The remaining 98.9% is influenced by other factors not examined in this study.

The average regression of the elementary school examination (X_3) against the junior high school report card average (Y)

A linear model can describe the regression of X_3 to Y with the equation model $\hat{Y} = \beta_0 + \beta_1 X_3 + \varepsilon$ on the population and the equation $Y = b_0 + b_1 X_3$ on the sample. Based on the test results using linear regression analysis, the following image is obtained:

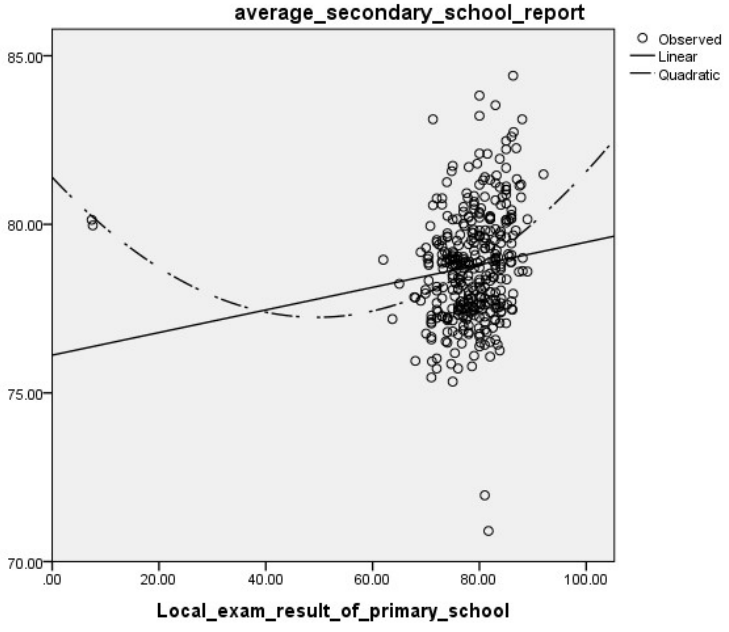

Fig. 3. Regression pattern of X_3 against Y

The results of the ANOVA analysis obtained the value of F = 7.488 with a significance of 0.007 < 0.05, so it was concluded that there was a linear regression of the average elementary school exam (X_3) on the average report cards of junior high school students. In other words, the average elementary school exam (X_3) affects

the average junior high school report card (Y). This result also indicates that the average elementary school exam (X_3) can be used to predict student achievement in junior high school. The coefficients on the sample linear regression equation are as follows:

Table 3

Linear regression coefficient X_3 against Y

Model	Unstandardised coefficients		Standardised coefficients	T	Sig.
	B	Std. Error	Beta		
Elementary school exam	.034	.012	.144	2.736	.007
(Constant)	76.121	.964		78.938	.000

The analysis shows the coefficient $b_0 = 76.121$ and $b_1 = .034$. Thus the regression equation for the sample from the average elementary school exam (X_3) to the average junior high school report card (Y) is $Y = 76.121 + .034X_3$. This equation can predict the average report cards of junior high school students if the average elementary school exam results when they enter junior high school are known, regardless of the path of entry. The results of statistical analysis of the coefficient of determination $R_2 = 0.021$ or 2.1%, which symbolises the magnitude of the influence of X_3 on Y. So that the average elementary school examination (X_3) can only predict the average value of report cards or student learning achievements in junior high schools of 2.1%. The remaining 97.9% is influenced by other factors not examined in this study.

X_1, X_2, and X_3, regression against Y

Taken together, the average national elementary school-based school examination (X_1), the average elementary school report card (X_2), and the average elementary school examination (X_3) have a linear regression on the average student report card in high school, first (Y) as a criterion. ANOVA analysis shows the value of $F = 3.301$ with a significance of $0.021 < 0.05$, so there is multiple regression, X_1, X_2, and X_3, against Y. The average national elementary school national examination scores (X_1), the average elementary school report cards (X_2), and the average elementary school exams (X_3) affect the average junior high school report cards (Y). The effect is represented by the linear regression equation $\hat{Y} = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$ on the population, while the sample is represented by the equation $Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3$. This model symbolises the influence of X_1, X_2, and X_3 together on Y. The coefficient of the regression equation in the sample is shown in Table 4.

Table 4

Linear regression coefficients X_1, X_2, and X_3 against Y

Model		Unstandardised coefficients		Standardised coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	75.644	1.096		68.994	.000
	(X_1)	.022	.014	.103	1.546	.123
	(X_2)	.002	.022	.009	.109	.913
	(X_3)	.017	.022	.073	.777	.438

The results of the linear regression equation on the sample Y = 75,644 + .022X_1 + .002X_2 + .017X_3. This equation symbolises the effect of the national standard school examination scores for elementary schools (X_1), average elementary school report cards (X_2), and average elementary school examinations (X_3) together on the average junior high school report cards (Y). This equation can predict that the average report card symbolises students' learning achievement in junior high school if the national standard school examination scores, the average report card, and the average primary school examination are known. The results of the analysis of the predictive power of X_1, X_2, and X_3 on Y are represented by the coefficient of determination R_2 with a value of R_2 = 0.027 (2.7%). That is, together with the national standard school examination scores (X_1), the average elementary school report cards (X_2), and the average elementary school exams (X_3) can predict the average junior high school report cards of 2.7%. Other factors not examined predict the remaining 97.3% of average junior high school report cards.

Discussion

The purpose of the zoning system is to make it easier to access new admissions services for students around the school, ensure that school-age residents can get an education, and accommodate students' talents and potential [26, 27]. It is hoped that the zoning system within a certain radius will reduce the costs and risks of transporting students to school so that parents benefit from the cost and safety of their children on the way to school [28]. The zoning system prioritises prospective new students who come from the environment around the school, with a portion of 50–70%. At the same time, the rest are groups of new students with several academic and non-academic achievements, affirmation groups from underprivileged families, and groups due to their parents' job transfers. With this system, it is hoped that students with more varied potential, talents, and learning achievements will be obtained.

Based on the results of this study, it is proven that there is no difference in the average junior high school report cards for students who enter through the zoning route, through the academic/non-academic achievement path, the affirmation pathway, or the parental transfer path. This result is concluded based on the one-way ANOVA test, with a value of F = 1.298 with a significance of 0.275. Descriptively, the average report cards of junior high school students were not much different, namely: 1 = 78.73 in the group of students who entered through the zoning route; 2 = 79.24 in the group that entered through the academic/non-academic achievement pathway; 3 = 78.55 in the group that entered through the affirmation route; and 4 = 78.80 for students who entered because of a transfer of parents. The variance between groups was also not much different, with a standard deviation ranging from 1.48 to 1.72. Although no significant difference was found based on the student's entry route, the average report card scores of junior high school students who entered through the academic/non-academic achievement pathway were higher

than those who entered through other routes. This result is relevant to the previous findings by J. B. McGee et al. and A. J. M. Karkar et al. [29, 30].

Findings of research facts prove that using zoning pathways in junior high schools, with a minimum proportion of 50% of new students, is less useful. More than 70% of schools accept new students through the zoning route in its implementation. The zoning system with too large a proportion has caused a reduction in the variety of academic abilities of prospective students who will enter a junior high school because prospective new students tend to be homogeneous in many ways. The zoning system with a large portion can even eliminate the opportunity for schools to obtain prospective students with better academic potential. This finding supports previous research on using the new student admission system. The zoning system has violated the principle of justice because the government has not been able to equalise the quality of schools between zones. The community is forced to attend schools within the zoning of their homes and loses their right to attend the superior schools they want [31]. This research is in line with research findings on implementing the zoning system in Nigeria, which states that the zoning system is not economically, pedagogically, or administratively useful [32]. Whereas J. L. Quiroz et al. [33] found that the chances of getting into a university in Chile increase as students move away from home.

This research also proves that the purpose of implementing the zoning system is expected by the Indonesian government, as stated by F. Firmansyah et al. [34], namely, among others, to help protect the quality of outputs by intervening in inputs and for equal education [35], which cannot be achieved properly. This research shows that the average learning achievement of students who enter through four different pathways does not significantly differ. In addition, these system files used as entry requirements have low predictive power on future learning achievement.

From the results of linear regression analysis, it can be concluded that the data used as a file for entry requirements to junior high school is achievement data when prospective school students are at the elementary school level. The average elementary school-based school exam (X_1), the average elementary school report card (X_2), and the average elementary school exam (X_3) have a linear regression on the average student report card in junior high school (Y), either partially or collectively. This finding is relevant to the research by W. D. Mulyono & Suprapto [36], who concluded that the data from the admission selection at an educational institution affects students' learning achievement in the future. The coefficient of determination of several predictors against the criteria is shown in Table 5.

Table 5

Coefficient of determination of several predictors against criterion Y

Predictors	R	R Square	Adjusted R Square
X_1	.153	.023	.021
X_2	.117	.014	.011
X_3	.144	.021	.018
X_1, X_2, X_3	.165	.027	.019

Table 5 describes the predictive power of the predictors against the criteria. The national elementary school-based school examination average (X_1) can only predict the average junior high school report card of the students concerned by 2.3%. Meanwhile, the average elementary school report cards (X_2) could only predict 1.4%, and the average elementary school exams (X_3) only predicted 2.1%. Together, these predictors could only predict the average student report card in junior high school (Y) of 2.7%.

The statistical analysis showed that the coefficient of determination of the predictors X_1, X_2, and X_3 against the Y criteria, either partially or jointly, only ranged from 1.4%–2.7%. Thus, variations in the average student report cards in junior high school (Y) can only be explained by variations in the data when these students graduate from elementary school. Variations in student learning achievement when graduating from junior high school are more influenced by factors that were not studied. This fact proves that the data used as a condition for entry into the admission system for new students in junior high school are less able to predict student achievement when they graduate from junior high school.

The implications of the results of this study include the need for a more in-depth evaluation of the zoning system in the acceptance of new students in junior high schools. On the one hand, the zoning system can close the distance between the student's residence and the school to reduce the burden of transportation costs and all the risks. On the other hand, the proportion of zoning that can reach 70% of prospective students causes a decrease in the variation in the ability of prospective students who are accepted to be less competitive. Empirically, it is also proven that separating entry pathways to junior high school through the zoning system does not cause differences in student achievement until they graduate from junior high school. For this reason, policies more accommodating to the situation are needed, such as increasing the proportion of academic/non-academic achievement pathways and affirmation pathways.

The weak predictive power of learning achievement in elementary schools, which is used as a condition for accepting new junior high school students, also implies the need for renewal in these requirements. The selection system based on administrative documents in the form of school achievement results in elementary schools needs to be strengthened by the implementation of standardised tests so that the potential of prospective students can be fulfilled and well-mapped. One of the benefits of using tests in the selection process is to see the effectiveness of predicting student success [37–40]. The effect of tests on the admission selection to educational institutions can predict student learning achievement by 9.2%.

Conclusions and Recommendations

Based on the results of this study, it can be concluded:

(1) There is no difference in the average report cards of junior high school students when viewed from the path when they entered the junior high school through the zoning system. The results of one-way ANOVA obtained F = 1.298

with a significance level of .275. Differences in students' entry paths to junior high school, namely from the zoning pathway, academic and non-academic achievement pathways, affirmation pathways, and parental transfer paths, are proven not to affect their learning achievement in junior high schools.

(2) There is a linear regression from the average national elementary school-based school examination (X_1), the average elementary school report card (X_2), and the primary school examination average (X_3) to the average student report card in junior high school (Y), either partially or jointly. (3) When they graduate from elementary school, students' learning achievement has a weak predictive power on students' learning achievement in junior high school. The national primary school-based school examination average, primary school report card average, and elementary school examination average, used as entry requirements for junior high school in the zoning system, only have a predictive power of 1.4%–2,7%.

Recommendations from the results of this study include the need for a more in-depth evaluation of the zoning system in the acceptance of new students in junior high schools. The proportion of prospective students who enter from the non-zoning pathway needs to be increased to get students with more varied abilities. In addition, a selection system that only refers to administrative requirements should be equipped with an entrance test-based selection system to get more varied and competitive students.

References

1. Slowik J., Peskova M., Shatunova O. V., Bartus E. The competences of young teachers in the education of pupils with special educational needs. *Obrazovanie i nauka = The Education and Science Journal*. 2021; 22 (10): 139–160. DOI: 10.17853/1994-5639-2020-10-139-160

2. Rindrayani S. R. The implementation of character education in Indonesia high school curriculum program. *Universal Journal of Educational Research*. 2020; 8 (1): 304–12. DOI: 10.13189/ujer.2020.080137

3. Muammar M. Problematika Penerimaan Peserta Didik Baru (PPDB) Dengan Sistem Zonasi Di Sekolah Dasar (SD) Kota Mataram. *El Midad Jurnal PGMI*. 2019; 11 (1): 41–60. DOI: 10.20414/elmidad.v11i1.1904 (In Indonesian)

4. Darya I. G. P. Evaluasi Implementasi Sistem Penerimaan Peserta Didik Baru (PPDB) di Kota Balikpapan, Indonesia. *Jurnal Penelitian Pendidikan*. 2020; 20 (1): 32–41. DOI: 10.17509/jpp.v20i1.24551 (In Indonesian)

5. Brandenburg R., McDonough S. Ethics, Self-study research methodology and teacher education. Vol. 20. Singapore: Springer; 2019. 174 p.

6. Marcelli M., Scanu S., Frattarelli F. M., Mancini E., Carli F. M. A benthic zonation system as a fundamental tool for natural capital assessment in a marine environment: A case study in the Northern Tyrrhenian Sea, Italy. *Sustainability*. 2018; 10 (10): 1–14. DOI: 10.3390/su10103786

7. Alghamdi A. K. H. Saudi undergraduate students ' need s of pedagogical education for energy literacy. *Turkish Science Education*. 2020; 16 (4): 521–537. DOI: 10.36681/tused.2020.5

8. Suna E., Tanberkan H., Özer M. Changes in literacy of students in Turkey by years and school types: Performance of students in PISA applications. *Journal of Measurement and Evaluation in Education and Psychology*. 2020; 11 (1): 76–98. DOI: 10.21031/epod.702191

9. Hanreddy A., Östlund D. Alternate curricula as a barrier to inclusive education for students with intellectual disabilities. *International Electronic Journal of Elementary Education*. 2020; 12 (3): 235–247. DOI: 10.26822/iejee.2020358217

10. Erni S., Wang X., Taylor S., Boulanger Y., Swystun T., Flannigan M., Parisien M. A. Developing a two-level fire regime zonation system for Canada. *Canadian Journal of Forest Research*. 2020; 50 (3): 259–273. DOI: 10.1139/cjfr-2019-0191

11. Sriartha I. P., Giyarsih S. R. Spatial zonation model of local irrigation system sustainability (A case of subak system in Bali). *Indonesia Journal of Geography*. 2015; 47 (2): 142–150. DOI: 10.22146/ijg.9253

12. Lopez de Aguileta G. Developing school-relevant language and literacy skills through dialogic literary gatherings. *International Journal of Educational Psychology*. 2019; 8 (1): 51–71. DOI: 10.17583/ijep.2019.4028

13. Roper M., Taimo L., Bisgard J. L., Tjasink K. Validating an evaluation school functionality tool. *African Evaluation Journal*. 2020; 8 (1): 1–16. DOI: 10.4102/aej. v8i1.423

14. Arteaga I., Thornburg K., Darolia R., Hawks J. Improving teacher practices with children under five: Experimental evidence from the Mississippi Buildings Blocks. *Evaluation Review*. 2019; 43 (1–2): 41–76. DOI: 10.1177/0193841X19865070

15. Ochako M. N., Aseey A. A. Operational strategies and sustainability factors influencing implementation of education intervention in honduras, central America: Avanzado libros project. *International Journal of Education and Practice*. 2020; 8 (2): 347–355. DOI: 10.18488/journal.61.2020.82.347.355

16. Mc Pherson-Geyser G., de Villiers R., Kavai P. The use of experiential learning as a teaching strategy in life sciences. *International Journal of Instruction*. 2020; 13 (3): 877–894. DOI: 10.29333/iji.2020.13358a

17. Alasheev S. Y., Kuteinitsyna T. G., Postalyuk N. Y., Prudnikova V. A. Managerial focus of a regional vocational education and training system on the needs of socio-economic development. *Obrazovanie i nauka = The Education and Science Journal*. 2021; 23 (10): 44–77. DOI: 10.17853/1994-5639-2021-10-44-77 (In Russ.)

18. Yam F. C., Kumcagiz H. Adaptation of General Phubbing Scale to Turkish culture and investigation of Phubbing Levels of university students in terms of various variables. *Addicta: The Turkish Journal on Addictions*. 2020; 7 (1): 48–60. DOI: 10.5152/addicta.2020.19061

19. Brouwer S., Amick B. C., Lee H., Franche R-L., Hogg-Johnson S. The predictive validity of the return-to-work self-efficacy scale for return-to-work outcomes in claimants with musculoskeletal disorders. *Journal of Occupational Rehabilitation*. 2015; 25 (4): 725–732. DOI: 10.1007/s10926-015-9580-7

20. Bozkurt S., Ekitli G. B., Thomas C. L., Cassady J. C. Validation of the Turkish version of the cognitive test anxiety scale–revised. *SAGE Open*. 2017; 7 (1): 1–9. DOI: 10.1177/2158244016669549

21. Ozsaban A., Turan N., Kaya H. Resilience in nursing students: The effect of academic stress and social support. *Clinical and Experimental Health Sciences*. 2019; 9 (1): 71–78. DOI: 10.33808/marusbed.546903

22. Koçak D. Academic jealousy scale: Validity and reliability study. *Journal of Measurement and Evaluation in Education and Psychology*. 2019; 10 (4): 467–479. DOI: 10.21031/EPOD.566752

23. Fatchurahman M., Setiawan M. A., Karyanti K. Evaluation of the CSE-UCLA model on the performance of school counselor in Indonesia. *Perspektivy nauki i obrazovaniya = Perspectives of Science and Education*. 2022; 56 (2): 561–572. DOI: 10.32744/pse.2022.2.33

24. Nurieva L. M., Kiselev S. G. Problems of analysis of the relationship between the learning context and TIMSS testing results. *Obrazovanie i nauka = The Education and Science Journal*. 2023; 25 (1): 108–141. DOI: 10.17853/1994-5639-2023-1-108-141 (In Russ.)

25. Bulkani B., Setiawan M. A., Wahidah W. The discrepancy evaluation model in the implementation of online learning (on the basis of parents' perceptions). *Obrazovanie i nauka = The Education and Science Journal*. 2022; 24 (2): 116–137. DOI: 10.17853/1994-5639-2022-2-116-137

26. Pluzhnik I. L., Guiral F. H. A. Modelling a high quality education for international students. *Obrazovanie i nauka = The Education and Science Journal*. 2020; 22 (6): 49–73. DOI: 10.17853/1994-5639-2020-6-49-73

27. Romanov E. V. Efficiency assessment of higher education institutions: Contradictions and paradoxes: Part I. *Obrazovanie i nauka = The Education and Science Journal*. 2019; 21 (9): 9–48. DOI: 10.17853/1994-5639-2019-9-9-48 (In Russ.)

28. Deutschlander D. Enhancing engagement with faculty and staff to facilitate student success: An evaluation of a parent intervention. *Educational Evaluation and Policy Analysis.* 2019; 41 (3): 239–259. DOI: 10.3102/0162373719845653

29. McGee J. B., Winters M. A. Rethinking the structure of teacher retirement benefits: Analyzing the preferences of entering teachers. *Educational Evaluation and Policy Analysis*. 2019; 41 (1): 63–78. DOI: 10.3102/0162373718798488

30. Karkar A. J. M., Fatlawi H. K., Al-Jobouri A. A. Highlighting e-learning adoption challenges using data analysis techniques: University of Kufa as a case study. *The Electronic Journal of e-Learning*. 2020; 18 (2): 136–149. DOI: 10.34190/EJEL.20.18.2.003

31. Al-Mahasneh O. M. K., Ayasrah M. N. M., Yahyaa S. M. S., Al-Kriemeen R. A., Al-Swalha A. S. Favorite methods of teaching and evaluation among students in university colleges. *International Journal of Education and Practice.* 2020; 8 (2): 365–378. DOI: 10.18488/journal.61.2020.82.365.378

32. Pechnikov A. N., Prenzov A. V., Mashoshina A. A. The features of processes of skills (special competencies) formation. *Obrazovanie i nauka = The Education and Science Journal*. 2018; 1 (20): 9–53. DOI: 10.17853/1994-5639-2018-1-9-53 (In Russ.)

33. Quiroz J. L., Peeters L., Chasco C., Aroca P. Equal access to university education in Chile? An application using spatial Heckman probit models. *Mathematics*. 2022; 10 (280): 2–23. DOI: 10.3390/math10020280

34. Firmansyah F., Mustofa A., Estradivar., Damora A., Handayani C. N. N., Harris J., et al. Relationship between the wakatobi national park zonation system and dynamics of coral reef ecosystem condition. *COJ (Coastal and Ocean Journal)*. 2017; 1 (2): 147–156. DOI: 10.29244/COJ.1.2.147-156 (In Indonesian)

35. Choi J. H., McCart A. B., Hicks T. A., Sailor W. An analysis of mediating effects of school leadership on MTSS implementation. *Journal of Special Education*. 2019; 53 (1): 15–27. DOI: 10.1177/0022466918804815

36. Mulyono W. D., Suprapto. The relationship between new student selection tests and learning achievement at the vocational program. *Atlantis Press: Advance in Enginering Research*. 2021; 209 (Ijcse): 739–744. DOI: 10.2991/aer.k.211215.123

37. Saklofske D. H., Austin E. J., Mastoras S. M., Beaton L., Osborne S. E. Relationships of personality, affect, emotional intelligence and coping with student stress and academic success: Different patterns of association for stress and success. *Learning and Individual Differences*. 2012; 22 (2): 251–257. DOI: 10.1016/j.lindif.2011.02.010

38. Ayuningtyas A., Riyono B. Exploring anchor personality and true meaning in Indonesian young adults. *Changing Societies & Personalities.* 2023; 7 (2): 102–128. DOI: 10.15826/csp.2023.7.2.233

39. Barteit S., Guzek D., Jahn A., Bärnighausen T., Jorge M. M., Neuhann F. Evaluation of e-learning for medical education in low- and middle-income countries: A systematic review. *Computers & Education.* 2020; 145 (October): 1–18. DOI: 10.1016/j.compedu.2019.103726

40. Saribeyli F. R. Theoretical and practical aspects of student self-assessment. *Obrazovanie i nauka = The Education and Science Journal*. 2018; 20 (6): 183–194. DOI: 10.17853/1994-5639-2018-6-183-194

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