INFLUENCE OF TEACHING BEHAVIOUR ON STUDENTS' SCIENCE INTEREST: INSIGHTS FROM PRIVATE SCHOOLS IN THE KLANG VALLEY

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Abstract: This study investigates the impact of teaching behaviour on students' interest in science in private schools across the Klang Valley. Employing a non-experimental quantitative research approach, data was collected from 250 students in selected Klang Valley private schools via Google Form questionnaires distributed through email and WhatsApp. Both descriptive and inferential statistical techniques in SPSS were utilized for analysis. Results indicated that students highly perceived their teachers' teaching behaviour, though their interest in science was only moderate. Multiple regression analysis revealed significant predictors of students' science interest, with clarity and rapport being key factors. Clarity moderately influenced students' interest, while rapport had a more substantial effect. In summary, this study underscores the vital role of teachers' teaching behaviour in nurturing science interest among Klang Valley's private school students. The implications extend to educational policymakers, administrators, and teachers, emphasizing the importance of fostering science interest. Prioritizing effective teaching behaviours can create an enriching learning environment, boosting students' engagement in science and subsequently enhancing their academic performance.

Keywords: Teaching Behaviour, Students' Interest in Science, Science Education, Private School, Klang Valley

INTRODUCTION

Interest has long been acknowledged as a pivotal factor in motivating learners and elevating the quality of their learning experiences. A growing body of research suggests that heightening students' interest in the subject matter can significantly contribute to their academic achievement by fostering positive emotional and cognitive engagement with the content. For instance, increased interest can amplify intrinsic motivation (Schraw, Flowerday, & Lehman, 2001) and result in improved achievement (Harackiewicz et al., 2014; Hulleman & Harackiewicz, 2009). Moreover, other studies (Hidi & Renninger, 2006; Krapp & Prenzel, 2011; Mitchell, 1993; Wiseman & Hunt, 2013) indicate that cultivating interest yields additional benefits, such as heightened attention, integration of prior knowledge, and positive impacts on diverse abilities, including recognition, recall, persistence, effort, and academic motivation.

Science education holds immense importance in schools as it directly relates to students' lives and fosters critical thinking and problem-solving skills that are applicable throughout their lives (Arrieta et al., 2020). These lifelong skills enable students to generate ideas, make informed decisions, and understand the evidence-based nature of public policymaking. While governmental guidelines and examinations often emphasize STEM (Science, Technology, Engineering, and Mathematics) education at middle and high school levels, there is a growing belief among educators that science education should commence at an earlier stage (Helm & Katz, 2016). By engaging young students in science early on with exciting materials and experiences, it can instil motivation and curiosity, leading to sustained interest in sciences throughout their schooling years and equipping them with valuable problem-solving skills (Helm & Katz, 2016).

Students who exhibit genuine interest in a subject are more likely to regularly attend classes, actively pay attention, actively engage in learning, enrol in additional courses, process information effectively, and ultimately achieve academic success (Hidi & Harackiewicz, 2000). Students who are able to identify their academic passions during their high school and college years are better equipped for successful careers, as the motivating force of interest drives their learning and guides their academic and career paths (Renninger & Hidi, 2015). It is important to note that the absence of interest in learning can have a significant impact on student learning outcomes, underscoring

the need to cultivate student excitement for learning (KHairina & Syafrina, 2017; Riwahyudin, 2015). Hence, there's an urgent need for an effective instructional behaviours and teaching materials that can stimulate students' interest in studying, particularly science. In a nutshell, in order to increase student learning outcomes, students must be interested in learning, as this impacts whether or not teaching and learning objectives are met. The more interested a student is, the better the learning outcomes (Toma & Greca, 2018). Teachers have a critical role to play in increasing student learning outcomes by cultivating and strengthening students' interest in learning.

Teaching effectively and supporting students with diverse interests and abilities is a complex process. It is undeniable that one of the primary goals of teachers is to help students reach their academic potential. The selection of instructional strategies is a critical tool for teachers to foster student achievement. Gunnes and Donze (2016) have proposed a theoretical model that posits teachers can effectively manage student motivation, effort, and achievement through their deliberate choice of instructional practices. Their research suggests that extrinsically oriented teaching practices may be effective in motivating high-ability students, while intrinsically oriented teaching practices may be more effective for low-ability or short-sighted students. Educational psychologists have identified motivation as a key driver of student effort (Wigfield et al., 2009; Tokan & Imakulata, 2019), defined as the internal force that propels students to engage in learning tasks, and it is influenced by four main factors: extrinsic valuation for the task, intrinsic interest, self-concept of ability, and perception of control over the task (Gunnes & Donze, 2016). Thus, teachers have the power to shape students' motivational patterns through their deliberate selection of instructional practices and classroom environment design, which, in turn, can impact student effort and achievement (Ames, 1992; Wolter, 2004; Hornstra et al., 2015). In today's globalized education landscape, as the emphasis shifts towards enhancing teaching quality for improved student outcomes, the traditional role of a teacher is no longer sufficient to meet the complex demands of education. The most effective teachers are those who can optimize student learning and development (Pillsbury, 2005; Sieberer-Nagler, 2016).

The importance of instructional teaching quality in influencing various aspects of students' academic performance, such as motivation, cognitive processes, emotions, and educational outcomes, has been highlighted in research findings (Linnenbrink-Garcia, Patall, & Pekrun, 2016). Instructional teaching quality can be defined as the behaviours exhibited by teachers in the classroom that promote optimal development of students' affective, motivational, behavioural, and cognitive abilities (Sánchez Rosas & Esquivel, 2016). As instructional teaching quality is a highly adaptable factor that impacts student performance (Hattie, 2009), identifying its role in the development of these processes is a crucial objective in enhancing teacher education and student learning (Praetorius, Lenske, & Helmke, 2012). Specifically, teaching behaviour has been recognized as a critical predictor of the classroom learning environment. Research on teacher effectiveness emphasizes the significance of teaching behaviour for student outcomes, suggesting that classroom-level factors have a greater influence than school-level factors, and that teaching behaviour is the most crucial element in the classroom (Muijs et al., 2014; Townsend, 2007). Therefore, it has been recommended that initial teacher training and professional development should prioritize improving teaching behaviour. Several studies have demonstrated that specific aspects of teaching behaviour, such as classroom atmosphere, learning climate, class control, and instructional assistance, contribute to positive affective and cognitive outcomes for students (Antoniou et al., 2011; Guldemond & Bosker, 2009; Konstantopoulos & Sun, 2014; Kyriakides & Creemers, 2009; Teodorovic, 2011). However, teaching behaviour is considered multifaceted, and there is no consensus on the most appropriate terminology, number and nature of domains, or the best techniques for evaluating them (Maulana et al., 2017). Establishing reliable and precise metrics for evaluating teacher behaviour remains a challenging task.

By correlating certain teacher behaviours to specific student results, studies on teaching effectiveness have attempted to study this process. As part of the educational process, a teacher is frequently intended to assist students in learning. Some of the most typical classroom teacher behaviours investigated by researchers are namely clarity, enthusiasm, interaction, organization, disclosure, speech and pacing, and rapport (Hadie et al., 2019). Teaching effectiveness is a complex concept that involves the interaction of various traits or variables, as evidenced by the diverse range of factors used in its definitions. These variables are commonly used to evaluate traditional classroom teaching, but they may also reflect general teacher behaviour in other teaching approaches, such as interactive classes, tutorials, and group discussions (Hadie et al., 2019). Moreover, many of the items on the list represent key teaching behaviours, such as enthusiasm, clarity, rapport, and interaction, which have been found to positively impact student outcomes (Rodger, 2003; Rodger, Murray & Cummings 2007; Kunter et al., 2008; Barnes & Lock, 2010; Long, Ibrahim & Kowang, 2013). It is plausible that certain instructional behaviours are more likely to capture students' attention and interest, leading to improved engagement and learning outcomes.

PROBLEM STATEMENT

Despite concerted and systematic efforts to promote student participation in science studies and cultivate positive attitudes towards science and technology, the percentage of students enrolling in science at the upper secondary level remains below the targeted 60:40 ratio of science to arts, which is a matter of concern as pointed out by Halim & Meerah (2016). The open education system, combined with misconceptions about learning science, has further compounded the issue of low enrolment in science compared to the arts stream at the higher secondary level. Another contributing factor could be the low tolerance for failure among students. Studies have shown that Malaysian students do not necessarily dislike or fear science, but they often choose social sciences as they perceive them to be more manageable, as reported by KPM (2013). Similar concerns have been raised by UK governments, universities, and businesses over the past decade regarding the inadequate number of students opting for science subjects at the 'A' level (post-16) and university level, as well as the limited number of individuals pursuing science or STEM-based careers. As a result, numerous studies, including research by Archer et al. (2013) and Murphy & Whitelegg (2006), have been conducted to investigate the underlying reasons for this trend. While various issues have been identified, such as perceptions of science/scientists and lack of awareness about STEM-based careers, a recurring theme is the declining interest of students in science as they progress through secondary school, as highlighted by Kiemer et al. (2015).

Moreover, data obtained from Bullah and Yunus' research in 2018 also revealed that a significant majority of parents, approximately 75%, expressed a preference for schools that implement the Dual Language Programme (DLP), where the instruction of mathematics and science is conducted in English. Private educational institutions are overseen by independent entities and are financially supported by student tuition fees. These institutions typically levy higher fees to encompass enhanced facilities and cutting-edge technology. The management of private schools governs fee structures and teacher recruitment, with school administrators exclusively responsible for establishing teacher qualifications. Although private schools are obligated to adhere to government-endorsed curricula, the manner of instructional delivery is determined by the school board, as emphasized by SchoolAdvisor.my in 2021. It is worth noting that there is an urgent demand for proficient science educators capable of conducting lessons in English within private schools. Being among the select few schools in Malaysia offering the DLP, particularly in the urban Klang Valley region, can confer a significant advantage in attracting more parents to enrol their children in these private institutions. Given that parents consistently aspire to secure the best possible education for their children, the choice of a reputable school carries paramount importance, as emphasized by Wespieser in 2015 and Priya in 2018.

Teaching behaviour encompasses a wide range of instructional practices, including classroom management, pedagogical techniques, and student-teacher interactions. Previous studies have indicated that teachers' behaviour in the classroom significantly influences students' engagement and interest in learning (Brandišauskienė et al., 2021). Nevertheless, there exists a need for further exploration regarding how particular teaching behaviours influence students' interest in science, subsequently leading to positive outcomes in science education. By identifying the precise behaviours that shape students' interest in science, educators can develop targeted interventions and training programs to enhance teaching practices and student engagement in science.

LITERATURE REVIEW

Theoretical Framework

Interest development theory, as suggested by Hidi and Renninger in 2006, proposes that interest is a complex and evolving psychological concept that evolves over time through the interaction of individual and environmental factors. According to this theory, students' interest in science is shaped by their initial personal interest, which can be nurtured and cultivated through the instructional methods employed by teachers, such as their teaching behaviour. The foundation of this research is firmly rooted in the constructivist learning theory, which asserts that students construct knowledge actively, drawing from their current and past experiences (Fernando & Marikar, 2017; Ormrod, 2011; Resnick, 2017). It is crucial for educators to comprehend how students assimilate new information from both classroom settings and personal encounters, as underlined by Ormrod (2011), aligning with the principles of the constructivist learning theory. A profound understanding of students' backgrounds and reservoirs of knowledge equips teachers to effectively implement a constructivist approach to education and learning, as proposed by Fernando & Marikar (2017) and Resnick (2017) in their constructivist learning framework. The theoretical framework employed in this study, as depicted in Figure 1, was devised to investigate whether teachers' teaching behaviour have a direct impact on students' interest in science.

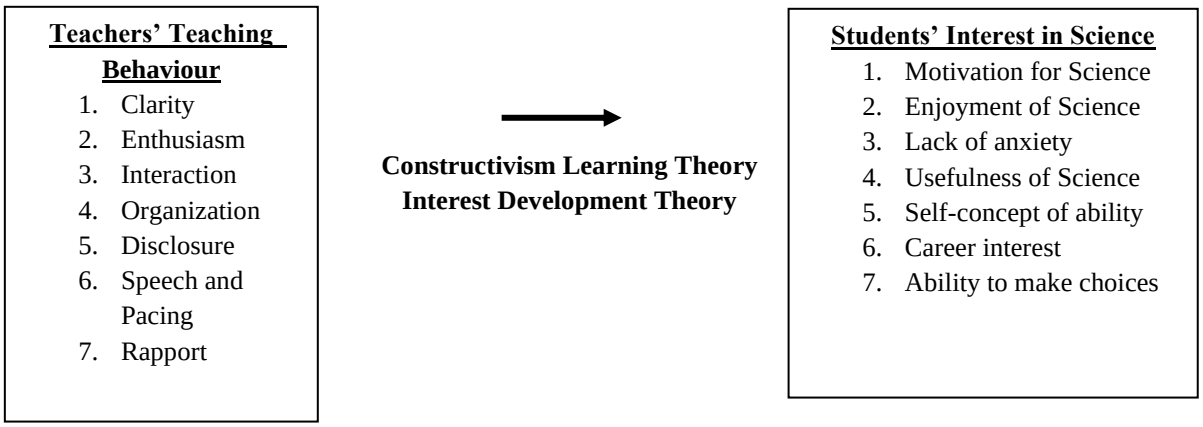

Figure 1. Theoretical Framework of the Study

Teachers' Teaching Behaviour and Students' Interest

Teachers consistently strive to tailor their instructional approach to accommodate the unique interests, knowledge, and skills of their students, while building upon their questions and ideas. A thorough understanding of students' cognitive potential, developmental stage, physical attributes, affective development, motivation, and learning style is essential for informed decision-making regarding instructional strategies (Klutse, 2021). Effective teacher behaviour, which encompasses the actions of teachers that influence student learning and outcomes (Creemers, 1994; Sammons, Hillman, & Mortimore, 1995), has been consistently identified as a crucial factor in determining students' academic performance. Extensive research has shown that positive teaching behaviour significantly impacts students' academic engagement, including their effort exertion, persistence, attention, focus, enjoyment, and excitement in learning (Davidson, Gest, & Welsh, 2010; Maulana et al., 2012; Opdenakker et al., 2012; Skinner, Kinderman, & Furrer, 2009; Jingkun et al., 2021). Moreover, teachers' behaviours have been found to wield a substantial influence on students' motivation to learn and the overall effectiveness of the learning process (Jingkun et al., 2021). According to research findings, teaching expertise extends beyond subject matter knowledge and necessitates a comprehensive understanding of pedagogy and learning theories for effective instructional delivery (Ismail et al., 2018). Teachers must continually strive to improve their instructional practices by learning from their peers, sharing experiences, and considering various approaches and techniques that can be implemented in the classroom. Student motivation, as defined by Gunnes & Donze (2016), is the internal drive that propels students to engage in learning tasks and is influenced by factors such as the extrinsic value of the task, intrinsic interest, self-concept of ability, and perception of control over the task. Different students may exhibit varying levels of motivation, and intrinsic motivation has been linked to better failure tolerance and increased effort after experiencing failure (Anderman and Wolters, 2006). Teachers can influence students' motivational patterns and enhance student effort and achievement through the utilization of diverse teaching methods and classroom environment design (Ames, 1992; Wolters, 2004).

Past research has identified numerous domains of effective teaching behaviour that have an impact on students' academic outcomes. However, many of these studies have focused on specific domains in isolation, rather than taking into account the entire spectrum of domains. These domains encompass various aspects such as pedagogical knowledge, teacher-student relationships, instructional methods, clarity of instruction, classroom management, enthusiasm for teaching, professional characteristics, teaching skills, and classroom climate. In a recent study conducted by Maulana et al. (2017), it was found that effective teaching behaviour was positively correlated with students' academic engagement across all six domains. Notably, classroom management and clarity of instruction were found to exhibit the strongest links to academic engagement in comparison to other domains, a finding corroborated by another study of experienced teachers conducted by Maulana et al. (2012). Despite the acknowledged significance of effective teaching behaviour in fostering student interest and outcomes, there has been limited attention devoted to exploring how teachers can cultivate intrinsic motivation in students, which in turn can enhance effort and reduce dropouts (Akerlof & Kranton, 2002). Additionally, the extent to which teachers' effective behaviour in the classroom relates to students' interest or engagement remains an unanswered question.

Private Schools

In recent times, an increasing number of parents prefer to enrol their children in private schools due to their perception that these schools offer superior education, a conducive learning environment, additional resources, and better policies and practices. This is supported by PISA results, which indicate that privately managed schools tend to have more autonomy, better resources, and higher performance on the PISA reading scale compared to publicly managed schools in most countries (OECD, 2012). Private schools enjoy autonomy in four main areas: curriculum, teaching methodology, staffing, and financing and governance structures. According to Nina (2016), this autonomy allows private schools to be responsive to parents' demands. Additionally, Najjar (2008) concludes that private schools differ from public schools in terms of external control, internal authority patterns, and relationships. In private schools, greater decision-making freedom for principals and staff leads to more effective operations, greater accountability to parents, a conducive and less disciplinary learning culture, and increased teacher job security, resulting in a greater sense of belonging to the school (Najjar, 2008). Consequently, private schools have the potential to offer high-quality education (Altaf, 2016).

Private schools generate profits based on their student enrolment numbers. Successful private schools may expect to achieve profits ranging from 20 to 30 percent of their revenue, as noted by Nina (2016). In order to attract a larger number of students, private schools need to carefully consider the demands of parents regarding curricula, teaching methods, facilities, and discipline, while also being responsive to the needs of students, as emphasized by the OECD (2012). The competition among schools is particularly prominent at the upper secondary level of education, where educational programs are often more differentiated compared to lower levels of education. The fact that both the international and private schools operate in an intensely competitive market environment also means that the balance between the competing imperatives – academic versus commercial – can be quite challenging. Private schools have to be customer-oriented and ensure that they are responsive to the needs of parents and meet required educational expectations, i.e. ensuring low student: teacher ratios, opportunities for teacher training and development, a balance between the academic and non-academic programme to offer a 'holistic' educational experience, and high standard of infrastructure and facilities (Nina, 2016).

OBJECTIVES AND RESEARCH QUESTIONS

Research Objectives

The study's objectives are presented as follows:

1. To examine the level of students' interest in science in Private Schools, Klang Valley, Malaysia.
2. To examine the level of teachers' teaching behaviour in Private Schools, Klang Valley, Malaysia.
3. To explore the predicting dimensions of the teachers' teaching behaviour on students' interest in science in Private Schools, Klang Valley, Malaysia.

Research Questions

Derived from the study's objectives, the research questions are as follows:

1. What is the level of students' interest in science as perceived by the students in Private Schools, Klang Valley, Malaysia?
2. What is/are the teachers' teaching behaviour in Private Schools, Klang Valley, Malaysia?
3. Which dimensions of teachers' teaching behaviour are predictors of students' interest in science in Private Schools, Klang Valley, Malaysia?

METHODOLOGY

Research Design and Study Procedure

In this research, a non-experimental survey research methodology has been utilized. As outlined by Djamba (2002), survey research is a quantitative approach that involves presenting a series of queries to a group of individuals (referred to as respondents) to collect information about their beliefs, perspectives, traits, and past or present actions. The chosen survey method for this study has been further enhanced by employing a questionnaire administered through the Google Form application.

To access the Google Form questionnaires, students were provided with a link through their respective class teachers. Prior to distributing the questionnaires to the participating students, a clear explanation of the research objectives and scope was offered to them. It was also emphasized that all the information and responses provided would be treated as confidential, and no individual students would be identified. Stringent measures were implemented to ensure that the collected data would be exclusively used for research purposes and maintained

with the utmost confidentiality. Students were informed of their voluntary participation in the study, and it was emphasized that their involvement was entirely optional. No efforts were made to exert any form of coercion or pressure to encourage participation.

The data collected in this study will undergo a comprehensive analysis that encompasses both descriptive and inferential techniques. Descriptive analysis will be utilized to gain insights into the demographic profile of the respondents, providing a thorough understanding of their background characteristics. Descriptive statistics, such as mean and standard deviation, will be employed to analyse the initial two research questions. Furthermore, multiple regression analysis will be conducted to elucidate the relationships among the variables.

Population and Sampling

The population of interest comprises students currently enrolled in private schools situated within the Klang Valley region of Malaysia. The sampling process entails the selection of a subgroup of individuals from a larger population for participation in a study, as outlined by Chua in 2012. In the context of this study, a sample size of 250 students, spanning across Form 1 to Form 3 and ranging in age from 13 to 15 years, was chosen from private secondary schools using a random sampling method.

The demographic attributes of the survey participants, which encompass gender, age, grade level, previous science exam grades, and involvement in science competitions or workshops, have been examined and are presented in **Table 1** for reference.

Table 1. Percentage Analysis for the Demographic Information of the Respondents

	Demographic Profile	**Frequency**	**Percentage (%)**
Gender	Male	130	52%
	Female	120	48%
Age	13 years old	41	16.4
	14 years old	89	35.6
	15 years old	120	48.0
Grade Level	Form 1	41	16.4
	Form 2	89	35.6
	Form 3	120	48.0
Grade in the previous Science exam	Grade A	76	30.4
	Grade B	54	21.6
	Grade C	50	20.0
	Grade D	46	18.4
	Grade E	12	4.8
	Grade F	12	4.8
Students' attendance or participation in any Science competition or Science workshop	Yes	87	34.8
	No	163	65.2

Research Instrument

The choice of instruments in this study was guided by the research objectives and a thorough examination of pertinent literature. To gauge students' interest in science, the Student Interests and Motivation in Science Questionnaire (SIMSQ) was employed, which was originally developed by Hassan in 2008. Furthermore, in assessing teachers' teaching behaviour, the Teacher Behaviour Inventory (TBI), a validated tool consisting of 32 items, developed by Hadie and colleagues in 2019, was utilized. Both instruments employed a 5-point numerical rating scale ranging from 1 to 5, with clearly defined anchors. In the case of SIMSQ, a score of 1 signifies 'Never,' while 5 signifies 'Always.' Conversely, for TBI, a score of 1 represents 'Almost never,' and 5 represents 'Almost always.' Permission from the original developers of these instruments was obtained via email for the usage in this study. In addition to questions about students' interest in science and teachers' teaching behaviour, respondents also provided information regarding their demographic background.

Validity and Reliability Analysis

The pilot study demonstrated strong internal consistency reliability across nearly all variables. Specifically, the Cronbach Alpha coefficients for the dimensions of teachers' teaching behaviour ranged from .711 to .842, while those for students' interest in science spanned from .688 to .897. Chua (2013) has suggested that a Cronbach's Alpha coefficient within the range of .65 to .95 is deemed satisfactory.

To ensure the content validity of the questionnaires, which entails assessing the clarity and comprehensibility of the questions, input was sought from a panel of experts, as recommended by Creswell in 2014. In this research, the researcher enlisted the feedback of two education specialists who reviewed the preliminary questionnaire used in the pilot study to evaluate the validity of the included items. Subsequently, the questionnaire underwent revisions based on the suggestions and recommendations provided by these experts.

Data Analysis

Quantitative data in this study were processed using the statistical software SPSS, where a combination of descriptive and inferential statistical methods was applied to address the study's three research questions. Before delving into data analysis, the researcher performed a normality test to validate the suitability of the chosen analytical techniques. The data analysis primarily centred on the utilization of multiple regression analysis.

FINDINGS

Level of Students' Interest in Science as Perceived by Private School Students in Klang Valley, Malaysia

The students' interest in science questions were asked based on the seven dimensions by Hassan (2008). The Student Interests and Motivation in Science Questionnaire (SIMSQ) is operationalised by 37 statements on a 5-point scale, whereby 1 represents 'Never' and 5 represents 'Always'. Table 2 shows the level students' interest in science in terms of mean and standard deviation values for the seven dimensions of students' interest in science.

Table 2. Descriptive Analysis for Students' Interest in Science

Dimensions	**Mean**	***SD***	**Level**
Enjoyment of science	3.91	0.79	High
Self-concept of ability	3.30	0.82	Moderate
Usefulness of science	3.82	0.66	High
Lack of anxiety	2.07	0.89	Low
Ability to make choices	2.92	0.96	Moderate
Motivation for science	2.84	0.86	Moderate
Career interest	3.34	0.77	Moderate
Students' Interest in Science	**3.17**	**0.52**	**Moderate**

Note: Mean – Low level = 1.00 – 2.33; Moderate level = 2.34 – 3.67; High level = 3.68 – 5.00

The mean values for the seven dimensions are between 2.07 and 3.91. Among the seven dimensions, enjoyment of science, which refers to the students' enjoyment of science learning experiences (M = 3.91, SD = 0.79) showed the highest mean, followed by usefulness of science which reflects to students' beliefs in the useful application of science for them and for society in general (M = 3.82, SD = 0.66), career interest which is a measure of the development of students' interest in pursuing a career in science (M = 3.34, SD = 0.77), self-concept of ability which deals with students' perception of their achievement in science (M = 3.30, SD = 0.82), ability to make choices which refers to students' empowerment to make decisions about their science learning (M = 2.92, SD =

0.96), motivation for science which refers to the extent to which students are motivated (M = 2.84, SD = 0.86), and finally lack of anxiety (M = 2.07, SD = 0.89) which is at a low level. Lack of anxiety refers to the extent to which students feel less anxious. From the table, the students did not differ much in their perception on their interest in science level. The overall mean value of students' interest in science is moderate (M = 3.17, SD = 0.52) which implies that there is a moderate level of interest in science among students.

Most items in each dimension of students' interest in science have shown the existence of high and moderate level of interest as perceived by the students. As interested students, they are enjoying the science learning experiences and rated highly on the usefulness of science. The students also reported on feeling less anxious about studying science. Adding on, the students also portray moderate level of self-concept of ability, ability to make choices, motivation for science and career interest. Overall, the students' interest in science is merely moderate, which is something that should be looked into to identify what is the cause of it.

Students' Perception of Teachers' Teaching Behaviour in Private Schools, Klang Valley, Malaysia

To determine the students' perception of their teacher's specific classroom behaviours, the questions adapted from Hadie et al. (2019)'s Teacher Behaviour Inventory (TBI) which consists of seven dimensions were used. The instrument had 32 items and were rated on a numerical rating scale of 1 to 5 and anchored endpoints, whereby 1 represents 'almost never' and 5 represents 'almost always'. **Table 3** illustrates a high level of teachers' teaching behaviour as perceived by the students which has an overall mean of 3.86 (SD = 0.63).

Table 3. Descriptive Analysis for Teachers' Teaching Behaviour

Dimensions	**Mean**	***SD***	**Level**
Clarity	3.89	0.77	High
Enthusiasm	3.66	0.86	Moderate
Interaction	3.92	0.78	High
Organization	3.88	0.79	High
Disclosure	3.87	0.80	High
Speech & Pacing	4.00	0.79	High
Rapport	3.78	0.78	High
Teachers' Teaching Behaviour	**3.86**	**0.63**	**High**

Note: Mean – Low level = 1.00 – 2.33; Moderate level = 2.34 – 3.67; High level = 3.68 – 5.00

Based on the findings, the speech & pacing dimension had the highest mean value (M = 4.00, SD = 0.79), followed by, in descending order, interaction (M = 3.92, SD = 0.78), clarity (M = 3.89, SD = 0.77), organization (M = 3.88, SD = 0.79), disclosure (M = 3.87, SD = 0.80), rapport (M = 3.78, SD = 0.78), and enthusiasm (M = 3.66, SD = 0.86). This shows that students perceived their science teachers' teaching behaviour highly with speech & pacing dimension is the most dominant among all.

In summary, the analysis reveals that teachers' teaching behaviour in private schools in Klang Valley, as perceived by students, exhibit a high mean value in almost all dimensions. The speech & pacing dimension has the highest mean value, while enthusiasm is rated at a moderate level with the lowest mean value. Overall, the analysis indicates that students have a positive perception of their science teachers' teaching behaviour, which plays a crucial role in student outcomes, as effective teaching behaviour is instrumental in fostering student engagement and interest in the subject.

Influence of Teachers' Teaching Behaviour on Students' Interest in Science in Private Schools located in Klang Valley, Malaysia

The results of the multiple regression analysis, as presented in **Table 4**, indicate that the prediction model included two out of the seven predictors, explaining 38.9% of the variance (R^2 = .389) in students' interest in science. These predictors, as indicated by the standardized coefficient beta, are clarity dimension (β = .221, p = .003 < .05) and rapport dimension (β = .444, p = .000 < .05). Further examination of the results reveals that rapport dimension had a large effect on students' interest in science, while clarity dimension showed a moderate effect. The other five dimensions - enthusiasm, interaction, organization, disclosure, and "speech & pacing" - were excluded from the regression model as their effects were not statistically significant on the criterion variable based on the research analysis.

Thus, the multiple regression model for this study is:
Students' Interest in Science = .444 (Rapport) + .221 (Clarity)

Furthermore, to assess multicollinearity among the variables, collinearity tolerance and variance inflation factor (VIF) were examined. The collinearity tolerance value was found to be .470, which is below the threshold of 2.0 (Chua, 2014), and the VIF value was 2.129, which is below the threshold of 10.00 (Hair et al., 2010). Hence, the results suggest that there were no issues of multicollinearity among the predictor variables in this study.

Table 4. Multiple Regression Analysis for Effects of Teachers' Teaching Behaviour on Students' Interest in Science

Model	**Standardized Coefficients β**	**t**	**p**	**Collinearity Diagnosis**	
				Tolerance	**VIF**
Clarity	.221	3.049	0.003	0.470	2.129
Rapport	.444	6.124	0.000	0.470	2.129

Note: R^2 = .389; Adjusted R^2 = .384; F = 78.773; p = 0.000;
Dependent variable: Students' Interest in Science

The results of the ANOVA test (F-test) presented in **Table 5** demonstrate a statistically significant relationship between clarity and rapport dimensions with students' interest in science [F (2, 247) = 78.773, p = .000] at a significance level of $p < .05$. The multiple regression analysis indicates that the combined contribution of these two predictor variables accounts for 38.9% of the variance in students' interest in science. This suggests that the remaining 61.1% of the variance cannot be predicted by teachers' teaching behaviour alone, as there may be other factors not examined in this study that could influence students' interest in science.

Table 5. Multiple Regression Analysis (Stepwise): ANOVA

Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	25.686	2	12.843	78.773	.000
Residual	40.270	247	.163		
Total	65.956	249			

Note: a) Dependent Variable: Students' Interest in Science
b) Predictors: (Constant), Rapport, Clarity

DISCUSSION

As per the findings of this research, students enrolled in private schools in the Klang Valley region have self-reported a moderate level of interest in science, with a mean score of 3.17 and a standard deviation of 0.52. The results indicate that most students neither strongly expressed interest nor strong disinterest towards the subject. The moderate level of interest among private school students in the Klang Valley raises concerns, as research suggests that interest plays a crucial role in enhancing learners' motivation and improving the overall quality of learning outcomes (Li, 2018; Triarisanti & Purnawarman, 2019).

Moreover, research conducted by Chan & Norlizah (2018) investigated the level of students' motivation towards science learning and their science achievement in ten secondary schools in Pahang, Malaysia. The findings revealed that students who exhibited moderate levels of motivation towards science learning achieved mid-low levels of achievement in their science subjects. Furthermore, the study found a significant correlation between students' motivation towards science learning and their science achievement. This finding is consistent with the research conducted by Leong et al. (2018), which also concluded that students with higher intrinsic motivation tend to perform better compared to those with lower intrinsic motivation. This trend was observed in four different countries, namely the United States, England, Malaysia, and Singapore.

Science education is pivotal in fostering critical thinking skills and cultivating a deep comprehension of scientific concepts that have practical applications in daily life (Bailin, 2002; Vieira & Tenreiro-Vieira, 2016). As such, it is imperative to identify the factors that influence students' interest in science and implement measures to enhance it. It may be worthwhile for educators to explore and implement more effective strategies aimed at fostering students' interest in science, with the ultimate goal of promoting engagement and motivation in this subject.

The moderate level of interest in science observed among private school students in Klang Valley can be attributed to multiple factors, including teaching approaches, parental and peer influence, and limited exposure to real-world applications. To address this issue, implementing interactive and hands-on teaching methods, involving parents in science-related activities, and providing opportunities for real-world experiences can potentially boost students' interest and engagement in science. Furthermore, fostering a positive classroom environment that encourages curiosity, exploration, and inquiry-based learning can also contribute to enhancing students' interest in science. It is hoped that innovative and engaging teaching approaches by educators can capture students' attention and increase their interest in science, thus establishing a solid foundation for their future academic and professional endeavours. The research findings emphasize the significance of improving students' interest in science, as it can significantly impact their academic achievement. Given the concern about the sustainability of the DLP, strategies to enhance students' interest in science should be prioritized to ensure their motivation and engagement in the learning process, resulting in improved learning outcomes and long-term success of the DLP in private schools in Malaysia. Moreover, policymakers should consider implementing measures to promote interest in science among students in private schools in Klang Valley.

The education system in Malaysia has undergone significant changes over time, with a strong emphasis on enhancing the quality of education provided to students. Private schools in the Klang Valley region have emerged as a popular choice among parents who are seeking to provide their children with a high-quality education. The present research study has revealed that students in private schools in Klang Valley have given high ratings ($M = 3.86$, $SD = 0.63$) to their science teachers' teaching methods. This finding suggests that the teaching approaches employed by science teachers in these schools are effective in engaging and educating their students, resulting in high levels of student satisfaction with their teachers' teaching behaviours.

In a study conducted by Xu and Qi (2019), the researchers examined the potential mediating role of self-efficacy in the relationship between teacher-student relationships and academic achievement among eighth-grade students in 762 secondary schools across 104 districts and counties in mainland China's Z province. The results revealed a significant positive association between positive teacher-student relationships and higher academic achievement. These findings suggest that mathematics teachers in Chinese secondary schools are successful in establishing strong relationships with their students, which in turn contribute to improved academic performance. Furthermore, a qualitative study conducted by Jasmi and Hin (2014) investigated the relationship between student-teacher interactions and academic motivation among students in a public boarding school in Peninsular Malaysia. The results indicated that academic motivation was positively influenced by teachers who demonstrated genuine care, provided continuous support, built trust, were approachable, and had high expectations for students' achievements. These findings suggest that the positive ratings given by students to their science teachers' teaching behaviour in private schools in the Klang Valley may be attributed to the teachers' ability to provide support and establish positive relationships with their students, which aligns with the findings of the Jasmi and Hin (2014) study.

The favourable perception of students regarding the teaching behaviour of their science teachers in private schools located in the Klang Valley region holds paramount importance for the sustainability of the DLP. As one of the limited number of schools in Malaysia that provide DLP, particularly in the urban Klang Valley area, the presence of qualified and proficient science teachers who are adept at delivering lessons in English confers a significant advantage in attracting parents to enrol their children in private schools. The high levels of satisfaction expressed by students with respect to their science teachers' teaching behaviour may serve as a catalyst for positive word-of-mouth referrals from students and parents alike, further bolstering the reputation of private schools that offer DLP. Moreover, proficient teaching behaviour plays a pivotal role in fostering active engagement of students in the learning process and facilitating their acquisition of essential knowledge and skills in the field of science. When students perceive their science teachers as engaging, clear in their communication, well-organized, and enthusiastic, it can significantly influence their motivation to learn, participation in the classroom, and overall academic performance. Such positive perceptions among students can, in turn, contribute to the success of the DLP by promoting student achievement and retention in private schools, thereby reinforcing the importance of effective teaching behaviour in the context of DLP implementation.

The findings of the stepwise multiple regression analysis revealed that out of the seven dimensions of teachers' teaching behaviour, namely clarity and rapport, had a statistically significant positive impact on students' interest in science in private schools in Klang Valley. These two dimensions, which encompass methods used to explain or clarify concepts and principles, as well as the quality of interpersonal relations between teachers and students, explained 38.9% of the variance in students' interest in science (Hadie et al., 2019).

The results of this study align with previous research, indicating that both clarity and rapport dimensions of teachers' teaching behaviour have a positive influence on students' interest in science. For example, Bolkan (2016) found that clear instruction can facilitate deep processing of classroom information, leading to improved student learning. The author suggested that clear explanations reduce students' extraneous cognitive load, which can help reduce anxiety and confusion and ultimately foster greater interest in science. When teachers use clear and effective explanations, students are more likely to understand and engage with the subject matter. Teachers who present information in a clear and organized manner, use appropriate language and explanations, and provide relatable examples and illustrations can facilitate students' understanding of science concepts, which in turn can nurture their interest in the subject. When students have a clear understanding of the content being taught, they are more likely to engage with the material and develop a deeper interest in science.

Similarly, Taş et al. (2018) found that teacher-student rapport positively influenced students' engagement in science. The authors reported that science teacher support positively predicted students' task value and academic self-concept in science, which can increase students' engagement in science. Teachers who establish a positive and supportive relationship with their students, show genuine care and concern, and create a classroom environment that is conducive to learning can significantly impact students' interest in science. When students feel comfortable, respected, and valued in the classroom, they are more likely to be motivated and engaged in the learning process, including developing an interest in science. Moreover, the finding that rapport had a large effect on students' interest in science, while clarity had a moderate effect, suggests that the quality of interpersonal relationships between teachers and students may be particularly important in fostering students' interest in science.

The results of this study underscore the significance of teachers' ability to communicate science concepts clearly and establish positive rapport with students in promoting their interest in science within the context of DLP in private schools in Klang Valley. As DLP involves instruction in both English and the local language, teachers who are proficient in communicating science concepts clearly and effectively in English, while also building positive rapport with students in both languages, can play a crucial role in fostering students' interest in science. Clear communication in English can enhance students' language proficiency, while positive rapport can create a supportive classroom environment that encourages active participation in science lessons and fosters a sense of ownership and enthusiasm for the subject among students.

CONCLUSION

In conclusion, this study presents valuable insights into the factors that influence students' interest in science education. Furthermore, the study revealed that students' perception of their teachers' teaching behaviour plays a pivotal role in shaping their interest in science, with the dimensions of clarity and rapport being significant predictors. While the clarity dimension had a moderate effect on students' interest in science, the rapport dimension had a larger impact. The results emphasize the crucial significance of proficient and effective teaching behaviour demonstrated by competent science teachers. These practices play a pivotal role in cultivating students' interest for science and upholding the sustainability of the DLP within private schools, especially in the urban Klang Valley region of Malaysia. It is essential for private educational institutions to prioritize the recruitment, ongoing professional development, and support of qualified science teachers who possess the ability to deliver English-medium lessons and promote effective teaching methods, thereby creating an optimal learning environment. By adopting these measures, private schools can not only attract more parents to enrol their children but also establish themselves as institutions renowned for delivering high-quality science education, characterized by a strong emphasis on student interest, engagement, and academic achievement. Additionally, the practical recommendations derived from this study can serve as a valuable resource for educators and teachers seeking to enhance students' interest in science education and elevate their overall academic performance.

REFERENCES

Akerlof, G. A., & Kranton, R. E. (2002). Identity and schooling: Some lessons for the economics of education. *Journal of economic literature*, *40*(4), 1167-1201.

Altaf, D. (2016). The Potential of Independent Religious Schools: A Case Study of Al-Amin. Policy Brief IDEAS (Institute for Democracy and Economic Affairs) No 4, June 2016.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of educational psychology*, *84*(3), 261-271.

Anderman, E. M., & Wolters, C. A. (2006). Goals, Values, and Affect: Influences on Student Motivation.

Antoniou, P., Kyriakides, L., & Creemers, B. (2011). Investigating the effectiveness of a dynamic integrated approach to teacher professional development. *CEPS journal*, *1*(1), 13-41.

Archer, L., DeWitt, J., Osborne, J., Dillon, J., Willis, B., & Wong, B. (2013). 'Not girly, not sexy, not glamorous': Primary school girls' and parents' constructions of Science aspirations. *Pedagogy, Culture & Society*, *21*(1), 171-194.

Arrieta, G. S., Dancel, J. C., & Agbisit, M. J. P. (2020). Teaching Science in the new normal: understanding the experiences of junior high school Science teachers. *Jurnal Pendidikan MIPA*, *21*(2), 146-162.

Bailin, S. (2002). Critical Thinking and Science Education. *Science & Education, 11*, 361-375.

Barnes, B. D., & Lock, G. (2010). The attributes of effective lecturers of English as a foreign language as perceived by students in a Korean university. *Australian Journal of Teacher Education*, *35*(1), 139-152.

Bolkan, S. (2016). The Importance of Instructor Clarity and Its Effect on Student Learning: Facilitating Elaboration by Reducing Cognitive Load. *Communication Reports, 29*, 152 - 162.

Brandišauskienė, A., Česnavičienė, J., Bruzgeleviciene, R., & Nedzinskaitė-Mačiūnienė, R. (2021). Connections between Teachers' Motivational Behaviour and School Student Engagement. *Electronic Journal of Research in Education Psychology, 19*, 165-184.

Bullah, N. H., & Yunus, M. M. (2018, August). Dual Language Programme: Parent's Perception. In *Proceedings of the 11th International Conference on Language, Education, and Innovation* (pp. 86-96).

Chan, Y. L., & Norlizah, C. H. (2018). Students' motivation towards Science learning and students' Science achievement. *International Journal of Academic Research in Progressive Education and Development, 6*(4), 174-189.

Chua, Y. P. (2012). *Mastering research methods*. Shah Alam: Mcgraw-Hill Education.

Chua, Y. P. (2013). *Mastering research statistics*. Shah Alam: Mcgraw-Hill Education.

Chua, Y. P. (2014). Research Methods and Statistics (Book 5): Multiple Regression. *Factor Analysis and Structural Equation Modeling Analysis: McGraw-Hill Education*.

Creemers, B. P. M. (1994). *The effective classroom*. London: Cassell. Sammons, P., Hillman, J., & Mortimore, P. (1995). *Key characteristics of effective schools: A review of school effectiveness research*. Paper presented at an internal seminar for Ofsted, London: Institute of Education.

Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks: Sage publications.

Davidson, A. J., Gest, S. D., & Welsh, J. A. (2010). Relatedness with teachers and peers during early adolescence: An integrated variable-oriented and person-oriented approach. *Journal of School Psychology, 48*, 483–510.

Djamba, Y. K. (2002). Social research methods: Qualitative and quantitative approaches. *Teaching Sociology*, *30*(3), 380-381.

Fernando, S. Y., & Marikar, F. M. (2017). Constructivist Teaching/Learning Theory and Participatory Teaching Methods. *Journal of Curriculum and Teaching, 6*(1), 110-122.

Guldemond, H., & Bosker, R. J. (2009). School effects on students' progress–a dynamic perspective. *School Effectiveness and School Improvement*, *20*(2), 255-268.

Gunnes, T., & Donze, J. (2016). Teaching Practices and the Management of Student Motivation, Effort and Achievement.

Hadie, S. N. H., Hassan, A., Talip, S. B., & Yusoff, M. S. B. (2019). The teacher behaviour inventory: validation of teacher behaviour in an interactive lecture environment. *Teacher Development*, *23*(1), 36-49.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate Data Analysis* (7th ed.). Prentice Hall.

Halim, L., & Meerah, T. S. M. (2016). Science education research and practice in Malaysia. In *Science education research and practice in Asia* (pp. 71-93). Springer, Singapore.

Harackiewicz, J. M., Tibbetts, Y., Canning, E., & Hyde, J. S. (2014). Harnessing values to promote motivation in education. In *Motivational interventions*. Emerald Group Publishing Limited.

Hassan, G. (2008). Attitudes toward science among Australian tertiary and secondary school students. *Research in Science & Technological Education, 26*(2), 129-147.

Hattie, J. (2009). Visible learning: A synthesis of meta-analyses relating to achievement. London: Routledge.

Helm, J. H., & Katz, L. G. (2016). *Young investigators: The project approach in the early years*. Teachers College Press.

Hidi, S., & Harackiewicz, J. M. (2000). Motivating the academically unmotivated: A critical issue for the 21st century. *Review of educational research, 70*(2), 151-179.

Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational psychologist*, *41*(2), 111-127.

Hornstra, L., Mansfield, C., Van Der Veen, I., Peetsma, T., & Volman, M. (2015). Motivational teacher strategies: the role of beliefs and contextual factors. *Learning environments research*, *18*(3), 363-392.

Hulleman, C. S., & Harackiewicz, J. M. (2009). Promoting interest and performance in high school Science classes. *Science*, *326*(5958), 1410-1412.

Ismail, M. A. A., Fakri, N. M. R. M., Mohammad, J. A. M., Nor, M. Z. M., Ahmad, A., & Yusoff, M. S. B. (2018). Teaching Effectiveness During Lectures in Universiti Sains Malaysia School of Medical Sciences. *Education in Medicine Journal*, *10*(3).

Jasmi, A.N., & Hin, L.C. (2014). Student-Teacher Relationship and Student Academic Motivation. Journal for Interdisciplinary Research in Education (JIRE), 4, 1-8.

Jingkun, Z. H. A. O., Haiming, H. O. U., & Jianjun, Y. I. N. (2021). The Relationship Between Teacher Transformational Leadership and Students' Motivation to Learn in Higher Education. *Higher Education of Social Science*, *20*(2), 39-51.

KHairina, R. M., & Syafrina, A. (2017). Hubungan antara minat belajar dengan hasil belajar siswa dalam mata pelajaran IPA pada kelas V SD Negeri Garot Geuceu Aceh Besar. *Jurnal Ilmiah Mahasiswa Pendidikan Guru Sekolah Dasar*, *2*(2).

Kiemer, K., Gröschner, A., Pehmer, A-K., & Seidel, T. (2015). Effects of a classroom discourse intervention on teachers' practice and students' motivation to learn mathematics and Science. *Learning and Instruction*, *35*, 94-103.

Klutse, G. Y. (2021). A Novel Approach to Integrated Science Teaching and Learning in a Selected Ghanaian Junior High School. *European Educational Researcher*, *4*(1), 1-27.

Konstantopoulos, S., & Sun, M. (2014). Are teacher effects larger in small classes?. *School Effectiveness and School Improvement*, *25*(3), 312-328.

KPM. (2013). Pelan Pembangunan Pendidikan Malaysia 2013-2025 (Pendidikan Prasekolah hingga Lepas Menengah). Putrajaya: Kementrian Pendidikan Malaysia.

Krapp, A., & Prenzel, M. (2011). Research on interest in Science: Theories, methods, and findings. *International journal of Science education*, *33*(1), 27-50.

Kunter, M., Tsai, Y. M., Klusmann, U., Brunner, M., Krauss, S., & Baumert, J. (2008). Students' and mathematics teachers' perceptions of teacher enthusiasm and instruction. *Learning and instruction*, *18*(5), 468-482.

Kyriakides, L., & Creemers, B. P. (2009). The effects of teacher factors on different outcomes: Two studies testing the validity of the dynamic model. *Effective Education*, *1*(1), 61-85.

Leong, K. E., Tan, P. P., Lau, P. L., & Yong, S. L. (2018). Exploring the Relationship between Motivation and Science Achievement of Secondary Students. Pertanika *Journal of Social Sciences & Humanities*, *26*(4).

Li, P. (2018). The Role of Interest in Motivation and Learning. *DEStech Transactions on Social Science, Education and Human Science*.

Linnenbrink-Garcia, L., Patall, E. A., & Pekrun, R. (2016). Adaptive motivation and emotion in education: Research and principles for instructional design. *Policy Insights from the Behavioural and Brain Sciences*, *3*(2), 228-236.

Long, C. S., Ibrahim, Z., & Kowang, T. O. (2013). An Analysis on the Relationship between Lecturers' Competencies and Students' Satisfaction. *International Education Studies*, *7*(1), 37-46.

Maulana, R., Opdenakker, M.-C., Stroet, K., & Bosker, R. (2012). Observed lesson structure during the first year of secondary education: Exploration of change and link with academic engagement. *Teaching and Teacher Education, 28*, 835–850.

Maulana, R., Helms-Lorenz, M., & Van de Grift, W. (2017). Validating a model of effective teaching behaviour of pre-service teachers. *Teachers and Teaching*, *23*(4), 471-493.

Mitchell, M. (1993). Situational interest: Its multifaceted structure in the secondary school mathematics classroom. *Journal of educational psychology*, *85*(3), 424.

Muijs, D., Kyriakides, L., Van der Werf, G., Creemers, B., Timperley, H., & Earl, L. (2014). State of the art–teacher effectiveness and professional learning. *School effectiveness and school improvement*, *25*(2), 231-256.

Murphy, P., & Whitelegg, E. (2006). Girls in the Physics Classroom: A Review of the Research on the Participation of Girls in Physics.

Najjar, D. (2008). *Effectiveness of management in private schools in Lebanon* (Doctoral dissertation, University of Birmingham). Retrieved from http://etheses.bham.ac.uk/324/1/Najjar09PhD.pdf

Nina, A. D. (2016). School Autonomy: Case Studies of Private School Chains in Malaysia. Policy IDEAS (Institute for Democracy and Economic Affairs) No 24, February 2016. OECD, for the Activity "Attracting, Developing and Retaining Effective Teachers".

OECD. (2012). Public and Private Schools: How Management and Funding Relate to their Socio-economic Profile, OECD Publishing.

Opdenakker, M.-C., Maulana, R., & den Brok, P. (2012). Teacher–student interpersonal relationships and academic motivation within one school year: Developmental changes and linkage. *School Effectiveness and School Improvement, 23*, 95–119.

Ormrod, J. E. (2011). *Educational psychology: developing learners*. 7th ed. Boston, Pearson/Allyn & Bacon.

Pillsbury, P. (2005). Only the Best: Hiring Outstanding Teachers. *Leadership*, *35*(2), 36-45.

Praetorius, A. K., Lenske, G., & Helmke, A. (2012). Observer ratings of instructional quality: Do they fulfill what they promise?. *Learning and instruction*, *22*(6), 387-400.

Priya, K. (2018). Key Factors Influencing Parental Choice of School for their Children in Namakkal District. *HuSS: International Journal of Research in Humanities and Social Sciences*, *5*(2), 85-91.

Renninger, K. A., & Hidi, S. (2015). *The power of interest for motivation and engagement*. Routledge.

Resnick, L. B. (2017). Toward a cognitive theory of instruction. In *Learning and motivation in the classroom* (pp. 5-38). Routledge.

Riwahyudin, A. (2015). Pengaruh sikap siswa dan minat belajar siswa terhadap hasil belajar IPA siswa kelas V sekolah dasar di Kabupaten Lamandau. *Jurnal pendidikan dasar*, *6*(1), 11-23.

Rodger, S. C. (2003). Teacher clarity and student anxiety: An aptitude-treatment interaction experiment. PhD thesis, University of Western Ontario.

Rodger, S., Murray, H. G., & Cummings, A. L. (2007). Effects of teacher clarity and student anxiety on student outcomes. *Teaching in Higher Education*, *12*(1), 91-104.

Sammons, P., Hillman, J., & Mortimore, P. (1995). *Key characteristics of effective schools: A review of school effectiveness research*. Paper presented at an internal seminar for Ofsted, London: Institute of Education.

Sánchez-Rosas, J., & Esquivel, S. (2016). Instructional teaching quality, task value, self-efficacy, and boredom: A model of attention in class. *Revista de Psicología*, *25*(2).

SchoolAdvisor.my. (2021, February 23). Dual Language Programme in National and Private Schools and the Second Language Integration in International Schools. Retrieved July 22, 2023, from https://schooladvisor.my/articles/dual-language-programme-in-national-and-private-schools-and-the-second-language-integration-in-international-schools

Schraw, G., Flowerday, T., & Lehman, S. (2001). Increasing situational interest in the classroom. *Educational Psychology Review*, *13*(3), 211-224.

Sieberer-Nagler, K. (2016). Effective classroom-management & positive teaching. *English Language Teaching*, *9*(1), 163-172.

Skinner, E. A., Kinderman, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and dissatisfaction: Conceptualization and assessment of children's behavioural and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*, 493–525.

Taş, Y., Subaşi, M., & Yerdelen, S. (2018). The role of motivation between perceived teacher support and student engagement in science class. *Educational Studies, 45*, 582 - 592.

Teodorović, J. (2011). Classroom and school factors related to student achievement: What works for students?. *School Effectiveness and School Improvement*, *22*(2), 215-236.

Tokan, M. K., & Imakulata, M. M. (2019). The effect of motivation and learning behaviour on student achievement. *South African Journal of Education*, *39*(1).

Toma, R. B., & Greca, I. M. (2018). The effect of integrative STEM instruction on elementary students' attitudes toward science. *Eurasia Journal of Mathematics, Science and Technology Education, 14*(4), 1383-1395.

Townsend, T. (Ed.). (2007). International handbook of school effectiveness and improvement: Review, reflection and reframing. Dordrecht: Springer.

Triarisanti, R., & Purnawarman, P. (2019). THE INFLUENCE OF INTEREST AND MOTIVATION ON COLLEGE STUDENTS'LANGUAGE AND ART APPRECIATION LEARNING OUTCOMES. *International Journal of Education*, *11*(2), 130-135.

Vieira, R.M., & Tenreiro-Vieira, C. (2016). Fostering Scientific Literacy and Critical Thinking in Elementary Science Education. *International Journal of Science and Mathematics Education, 14*, 659-680.

Wespieser, K. (2015). How do parents choose a school?. *Seced*, *2015*(16), 13-13.

Wigfield, A., Eccles, J. S., Roeser, R. W., & Schiefele, U. (2009). *Development of achievement motivation*. New York: Wiley.

Wiseman, D. G., & Hunt, G. H. (2013). *Best practice in motivation and management in the classroom*. Charles C Thomas Publisher.

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of educational psychology*, *96*(2), 236.

Xu, Z., & Qi, C. (2019). The Relationship between Teacher-student Relationship and Academic Achievement: The Mediating Role of Self-efficacy. *EURASIA Journal of Mathematics, Science and Technology Education*.