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Role of grit as mediator in the relationship of openness to experience and effectiveness of teachers during distance learning

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Abstract
The transition from offline to online learning is a challenge for teachers in effectively fulfilling their roles and necessitates openness and adaptability to change. Therefore, this study aimed to investigate the role of grit as a mediator in the relationship between openness to experience and the effectiveness of teachers. This was carried out during distance learning among 211 vocational high school teachers in DKI Jakarta. The results showed significant indirect (ab = .321, p < .01, 95% CI [.177, .487]) and direct effects (c' = 1.298, p < .01, 95% CI [.964, 1.633]). These results indicated that grit partially mediated the relationship between openness to experience and the effectiveness of teachers. Consequently, the study implied that fostering a high level of openness to experience enhanced grit and increased teachers' effectiveness.

INTRODUCTION

Since the beginning of 2020, Indonesia implemented a Distance Learning System (online learning) in response to the COVID-19 virus, which posed significant challenges. Meanwhile, the success and quality of education cannot be separated from the roles of teachers in conducting learning activities. A survey conducted by World Bank experts in 2020 showed that Indonesian teachers faced difficulties in adapting to distance learning (World Bank Expert, 2021). This was supported by the results of Indra et al. (2021) that teachers were caught unprepared by the sudden need to be creative and innovative in maintaining the motivation of students to learn at home. Teachers also experienced increased demands, such as being available to answer questions outside of regular class hours and even late at night (Indra et al., 2021), which added to the workload.

This burden resulted in frustration and reduced motivation among teachers (Badruddin & Qolby, 2021), and affected distance learning. It was shown that the phenomenon made teachers less motivated and avoided activities with students. The monotonous nature of online education led to student disinterest and reluctance to participate in learning, contrary to effective learning which required active engagement (Purwanti, 2022). Additionally, teachers faced challenges in adapting curriculum to an online context and lacked diverse instructional media (Arsendy et al., 2020), which was not associated with the characteristics of effective teachers, known for professionalism,

engagement, creativity, and positive student relationships (Kyriakides et al., 2002). This showed that the online learning situation presented challenges to effective teaching.

Low effectiveness of teachers could be attributed to various challenges, such as difficulties in using alternative learning media, lack of technology proficiency, reduced student interest, and strained student-teacher relationship (Taradisa et al., 2020; Ministry of Education and Culture, 2021). As a result, students had difficulty learning, reduced enthusiasm, and the motivation of teachers declined (Kodero et al., 2011; Meador, 2014, cited in Toom, 2015). The challenges were particularly significant in the vocational high school of DKI Jakarta which implemented a method with 60% practical and 40% theoretical proportion (Ministry of Education and Culture, 2021). This contradicted the current pandemic situation, which did not allow teachers to provide practical lessons in person. Interviews with several teachers in school further confirmed the challenges during online learning.

Teachers' effectiveness plays an important role in the educational success and academic achievement of students (Job, 2017). This was also defined by how well teachers could meet the criteria of abilities, characteristics, and behaviors in performing various roles (Kyriakides et al., 2002). Highly effective teachers strived to professionally develop themselves and build good relationships with the parents of students (Kyriakides et al., 2002). However, low effectiveness impacted performance, such as a decrease in ability to manage class, reduced motivation, and a decreased willingness to work hard (Meador, 2014).

A previous study found that both internal and external factors played a role in the effectiveness of teachers (Kim, Dar-Nimrod & MacCann, 2018). The external factors included school leadership style (Adu et al., 2015; Sirisooklip et al., 2015) and organizational culture (Babu & Kumari, 2013). Meanwhile, the internal factors included personality, grit, pedagogical competence, and social competence (Kim, Dar-Nimrod & MacCann, 2018; Duckworth et al., 2009; Rosdiana, 2013; Andini & Supardi, 2018; Shawer, 2017). Based on previous studies, grit, pedagogical and social competencies had a significant influence on the effectiveness of teachers (Kim, Dar-Nimrod & MacCann, 2018; Duckworth et al., 2009; Rosdiana, 2013; Andini & Supardi, 2018; Shawer, 2017). However, previous studies suggested that personality had only a limited impact on effectiveness (Kim et al., 2019; Klassen & Tze, 2014). Bardach et al. (2021) stated that personality needed to reflect how teachers behave while with students. Further examination is required to examine how personality factors enhance the effectiveness of teachers.

Regarding personality, the current distance learning system requires teachers to adapt and maintain a positive attitude toward change and be able to teach effectively. "Openness to experience" is an appropriate term for describing a teacher's ability to embrace change. It is defined as the tendency to be curious, unconventional, and open to new ideas and experiences (McCrae & Costa, 2010). Kyriakides et al. (2002) stated that openness to experience is the key to the success of learning.

Previous results showed that the relationship between openness to experience and the effectiveness of teachers was not consistent. Buela and Joseph (2015), as well as Harris (2019), found no relationship between openness to experience and teachers' effectiveness, which tended to prefer the familiar over the new, resisting change, and refusing to change teaching habits. Conversely, Arif et al. (2012) and Goel (2013) found that the personality dimension of openness to experience was one of the effective teachers' characteristics. Teachers with high openness to experience were interested in learning new things, including how to use technology to support distance learning (Adov & Mäeots, 2021). In learning to use technology, teachers integrated technology into their practices to adapt to online learning situations (Adov & Mäeots, 2021). This enhanced the effectiveness of teachers in distance learning during the pandemic.

Inconsistency in results suggested the possibility of other factors that strengthened or mediated the relationship between openness to experience and the effectiveness of teachers. Furthermore, teachers need determination and interest to achieve optimal learning goals, even in the face of various challenges. Openness to experience, determination, and strong interest can help teachers achieve set goals and create directed learning. The determination and interest of an individual to possess and achieve directed goals are known as the concept of "grit". Therefore, grit is defined as the tendency of an individual to maintain perseverance and enthusiasm to achieve long-term goals (Duckworth et al., 2007). In addition, Duckworth et al. (2007) classified grit into two dimensions, firstly, "perseverance of effort," which measures the tendency to maintain commitment and effort in difficult times (Duckworth et al., 2007). Secondly, "consistency of interest," which measures the ability to remain focused on specific interests or goals over an extended period (Duckworth et al., 2007).

Butz et al. (2018), Suzuki et al. (2015), and Yusup (2019) found that openness to experience has a strong positive influence on grit. The level of grit is higher when openness to experience is high. The results from Duckworth et al. (2009), Akram (2021), and Madden (2015) showed that grit is a strong effectiveness predictor. This means teachers with high grit levels had higher effectiveness (Duckworth et al., 2009). In the context of distance learning, teachers were required to make various efforts to adapt to this new learning system to achieve successful learning. Therefore, high grit levels will create effective teaching when accompanied by a high level of openness to experience. Based on the dynamics of the interaction of these three variables, it is assumed that grit mediated the relationship between openness to experience and effectiveness.

This study focused on vocational high school teachers in DKI Jakarta Province engaged in distance learning. The instruments used were the Teachers Effectiveness Scale (TES), the Big Five Personality Inventory (BFI) to measure the level of openness to experience, and the Grit Short Scale (Grit-S) to measure grit. The instruments were adapted to the Indonesian language. To answer the study questions, the obtained data were statistically analyzed using mediation analysis methods with Macro PROCESS Hayes in SPSS version 26.

THEORETICAL FRAMEWORK
Effectiveness of teachers

According to Kyriakides et al. (2002), the effectiveness of teachers refers to the criteria, including abilities, behaviors, and performance that support the performance of various roles in work. These criteria were grouped into eight clusters, namely goals and intentions, individualization, positive treatment of students, love for children, professionalism, collective responsibility, personal traits, and responsiveness to change. Effectiveness is affected by grit, personality, school principal leadership style, organizational culture, as well as pedagogical, social, and professional competencies (Akram, 2021; Duckworth et al., 2009; Madden, 2015; Buela & Joseph, 2015; Kim et al., 2018; Sirisookslip et al., 2015; Babu & Kumari, 2013; König & Pflanzl, 2016; Darling-Hammond et al., 2005; Dorgu, 2016).

Openness to Experience

According to McCrae and Costa (1999), openness to experience is defined as the tendency to be creative, imaginative, innovative, curious, and enjoy things that are different. McCrae and Costa (1999) also formulated the definition of openness to experience as an aspect of personality that determines how actively an individual seeks new experiences, reflects, and embraces new ideas. According to McCrae and Costa (2003), the indicators of openness to experience are divided into six aspects, namely (1) Openness to fantasy, (2) Aesthetics, (3) Feelings, (4) Openness to actions, (5) Openness to ideas, (6) Values.

Grit

According to Duckworth et al. (2007), grit is defined as perseverance and interest in long-term goals. Grit was classified into two dimensions, namely perseverance of effort and consistency of interest. Perseverance of effort is the tendency to maintain commitment and effort in difficult times (Duckworth et al., 2007). Meanwhile, consistency of interest is the ability to remain focused and determined toward specific interests or goals over an extended period (Duckworth et al., 2007).

METHODS

Type and Design

This study used quantitative analysis with a correlational design (Gravetter & Forzano, 2017), and examined the relationship between openness to experience as well as the effectiveness of teachers with grit as a mediator.

Participants

The participants comprised vocational high school teachers in DKI Jakarta who conducted distance learning. Furthermore, a non-probability sampling method was used in this study, specifically purposive (Gravetter & Forzano, 2017).

Instruments

The effectiveness variable was measured using TES developed by Kyriakides et al. (2002) and adapted to the Indonesian language by Primandhita (2020). This instrument consisted of 51 items rated on a 5-point Likert scale. Openness to experience variable was measured using BFI, specifically developed by John (1990), and later adapted into the Indonesian language by Ramdhani (2012). This instrument had 10 items rated on a 7-point Likert scale. Furthermore, the grit variable was measured using Grit-S developed by Duckworth and Quinn (2009) and adapted into the Indonesian language by Ginandra (2021) with 8 items rated on a 5-point Likert scale.

Procedures

This study comprised three distinctive phases, namely preparation, pilot testing, and implementation stages. In the preparation stage, a literature review was conducted, and the topic, variables, population, measurement tools, and proposal were determined. Subsequently, TES, BFI, and Grit-S were adapted and subjected to expert judgment, and readability testing and adjusted to the context of the participants. A pilot test of the measurement tools was conducted with 48 vocational high school teachers in DKI Jakarta engaged in distance learning. This was carried out through Google Forms and included reliability as well as the validity of measurement tools used. The implementation stage was carried out online from the end of November to December 2021, with the assistance of the DKI Jakarta Education Office, followed by Sub-Division offices of the City Mayor in each City of DKI Jakarta. The questionnaire links were distributed through WhatsApp groups that comprised principals from vocational high schools in each city and subsequently sent to teachers in their respective schools.

Statistical Analysis

The analysis included descriptive statistics to examine the general demographics of participants as well as variable descriptions. Furthermore, Pearson correlation was used to examine the correlations between variables and mediation analysis using the PROCESS tool available in IBM SPSS version 26. This examined the role of grit in mediating the relationship between openness to experience and the effectiveness of teachers.

RESULTS

Descriptive Analysis Results

This study used a total of 211 participants, with the majority being females, accounting for 128 teachers (60.7%) and 83 (39.3%) males. The participants had experience ranging from 1 year to 36 years (M = 3.25, SD = 2.046) and ages between 23 to 65 years (M = 43.94, SD = 11.457). In terms of geographical distribution, a significant portion was from East Jakarta, with 64 teachers (30.3%). Regarding the type of school, the participants were predominantly from public schools, with 142 teachers (67.3%) (Table 1.).

The scores for the effectiveness of teachers were not normally distributed as indicated by a skewness value of -1.446 (Standard Error SE = .167) which showed most scores were distributed to the right of the curve. The participants also had a high mean score for the effectiveness of teachers (Mean score = 4.6 > Median Scale = 3). Openness to experience scores was normally distributed with a skewness value of -.786 (SE = .167), although the value was negative, it did not exceed 1 (Nunnally & Bernstein, 1994). This showed an average openness to experience scores of participants were heterogeneous. They also had a high mean score for openness to experience (Mean score = 5.3 > Median Scale = 4). Grit scores were normally distributed with a skewness value of .130 (SE = .167) because it did not exceed 1 (Nunnally & Bernstein, 1994). This showed the average grit scores were heterogeneous. In addition, the participants exhibited high mean scores for grit (Mean score = 3.7 > Median Scale = 3).

Correlation Analysis Results

The Pearson correlation analysis showed that openness to experience had a positive and significant relationship with the effectiveness of teachers (r = .570; p < .01). Similar relationship was also found between grit and the effectiveness of teachers (r = .462; p < .01) as well as openness to experience and grit (r = .417; p < .01).

Main Analysis Results

Based on the regression analysis results (Figure 1.), the direct effect analysis showed a significant positive relationship between openness to experience and effectiveness of teachers (β = 1.298, SE = .0170, p < .01, 95% CI [.964, 1.633]). Additionally, an indirect effect analysis was conducted between openness to experience and effectiveness of teachers. The results of the mediation analysis through grit showed a significant positive relationship between openness to experience and grit (β = .204, SE = .030, p < .01, 95% CI [.144, .265]), as well as a similar relationship between grit and effectiveness of teachers (β = 1.573, SE = .347, p < .01, 95% CI [.889, 2.257]). These results showed that grit significantly mediated the relationship between openness to experience and the effectiveness of teachers (β = .321, SE = .080, p < .01, 95% CI [.177, .487]), therefore, the hypothesis was accepted. The significant results obtained in the direct effect value suggested that the relationship was partial mediation.
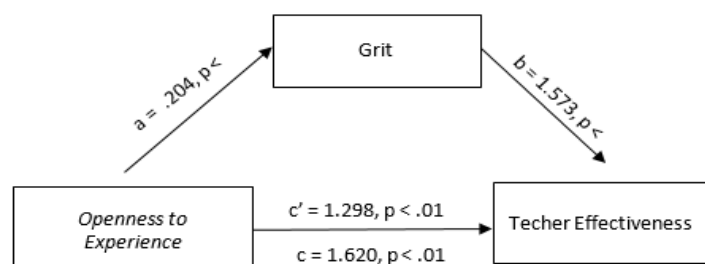
Direct effect (c') = 1.298, p < .01, 95% CI [.964, 1.633]
Indirect effect (ab) = .321, p < .01, 95% CI [.177, .487]

Figure 1 <Mediation of Variables>

Discussions

This study aimed to examine the role of grit as a mediator in the relationship between openness to experience and the effectiveness of teachers. The results supported the proposed hypothesis in vocational high school teachers. This occurred because grit enhanced performance in various aspects, such as the behavior of working hard. In a previous study, teachers with high grit levels tended to work harder and longer, even in challenging situations (Duckworth et al. 2007; Duckworth et al. 2009). This was consistent with the phenomenon that teachers faced various challenges due to the change from face-to-face to online learning systems. This change required teachers to work harder and address challenges such as difficulties in determining teaching methods, adapting to technology, monitoring student progress and comprehension, as well as maintaining positive student-teacher relationships (Taradisa et al., 2020; Ministry of Education and Culture, 2021).

The mediation analysis results showed that grit mediation values were partial. In this population, effectiveness could increase through grit mediation and the direct role of openness to experience on the effectiveness of teachers. This might be possible due to the similarity in characteristics between openness to experience and one grit dimension, specifically perseverance of effort. This was supported by previous results that openness to experience triggered curiosity, which then impacted perseverance in striving to achieve set goals (Barrick and Mount, 1991, as cited in Suzuki et al., 2015; Nye et al., 2012). Therefore, the relationship between openness to experience and with grit dimension could be a reason why the relationship between openness to experience and the effectiveness of teachers occurred directly.

The presence of openness to experience in teachers showed they were open and curious, which facilitated adaptation to the current online learning situation. Furthermore, grit was influenced, where openness and curiosity made them individuals with determination and a consistent interest in achieving effective teaching. As previously explained by Duckworth et al. (2007) and Duckworth et al. (2009), consistent efforts in facing difficult situations improved performance to enable effective teaching. This is by Kyriakides et al. (2002) that effective teachers were those who maintained their commitment and perseverance to teach professionally. Therefore, to maintain performance to effectively teach, teachers need grit to effectively carry out their role.

The data for this study were collected in November 2021. In the same month, the government implemented a limited Face-to-Face Learning system (Ministry of Education and Culture, 2021). This means the data were collected during the transition from distance to face-to-face learning. In this study, the role of grit in fully mediating the relationship between openness to experience and the effectiveness of teachers could have been found had it been the data collected at the beginning of the distance learning era. This is because teachers were still not accustomed to the challenges and tended to have difficulty overcoming them. Moreover, teachers in Indonesia have been teaching online for nearly 2 years since March 2020 (Napitupulu, 2022). This has made teachers "familiar" with the challenges, hence, knowing the efforts needed and no longer giving up easily. This was consistent with the results of Eskreis-Winkler et al., (2014) that similar and/or identical experiences increased grit and improved job performance. In other words, the experience of teachers in facing various challenges during the distance learning period made them persistent in creating effective teaching. Therefore, data collection conducted in the transition period from distance to face-to-face learning, as well as experience in overcoming distance learning-related challenges could explain why the relationship between openness to experience and effectiveness of teachers occurred directly.

Despite supporting the constructed hypotheses, this study still had limitations. Firstly, there was a possibility of response bias among teachers who may provide socially desirable responses when being evaluated. According to Anastasi and Urbina (1997), in filling out self-report

questionnaires, participants tended to respond in a more favorable direction (faking good). This was done for various reasons, such as self-protection, avoidance of criticism, a desire for social acceptance, and a perception of being judged (Salim et al., 2024). Secondly, the questionnaire consisted of 109 items. Berry et al. (1992, as cited in Meade & Craig, 2012) stated that a large number of items could lead to participant fatigue when filling. This was because lengthy questionnaires require more effort (Meade & Craig, 2012). Fatigue affected the responses, with participants filling in hastily to quickly complete the questionnaire (Meade & Craig, 2012).

CONCLUSIONS

In conclusion, the results showed that grit mediated the relationship between openness to experience and the effectiveness of teachers. These results supported the hypotheses, and it can be stated that openness to experience influenced grit as well as increased effectiveness of teachers.

Future studies should provide clearer instructions to participants and emphasize that responses will not affect their jobs or evaluate performance. This will help to avoid the occurrence of faking good behavior. Individual investigations should be conducted to prevent fatigue, thereby avoiding lengthy questionnaires. The Indonesian Ministry of Education and Culture, along with school institutions are motivated to design training programs aimed at enhancing the openness of teachers to new experience and improving their effectiveness. In cases where teaching remained ineffective after training, the Ministry of Education and school authorities are encouraged to provide additional sections to enhance grit. This will significantly influence the effectiveness level of teachers.

AUTHOR CONTRIBUTION STATEMENT

Rose Mini Agoes Salim, Aqilla Sekar Ningrum Prastyo, Nur Aisyah Rumalutur: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper. Dominikus David Biondi Situmorang: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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