ANALYSIS CLASIFICATION FACTORS OF WORK PRODUCTIVITY AMONG TEACHERS DURING WFH (*WORK FROM HOME*) BASED ON DECISION TREE

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ABSTRACT

The COVID-19 pandemic since its inception at the end of December in China and entering Indonesia in March 2020 has had many impacts on the world of employment, including in the realm of education. The COVID-19 pandemic has also had a strong impact on work productivity. Various different backgrounds ranging from work tenure, latest education level and emotional intelligence make the level of work productivity at SMPN 1 Tembelang quite varied. This research aims to analyze the classification factors that affect teacher work productivity during WFH. The type of research used is analytic observational with a cross sectional approach. This research was conducted at SMP Negeri 1 Tembelang Jombang with a sample of 45 people. Data analysis is done by Decision Tree. The results of the accuracy of the model testing generated from the training data to the testing data show that the accuracy value is 65.67%. The classification of high productivity levels is found in the group of teachers who have a long work tenure, mature age and high emotional intelligence. While the classification of medium productivity is dominated by groups of teachers with medium work tenure and adult age. It is recommended to conduct training and mentoring of online learning programs to improve skills and expertise for teachers, especially those who have who have a medium work tenure and classified as elderly.

Keywords: Decision Tree, Productivity, Worker, Teachers, WFH

INTRODUCTION

The COVID-19 pandemic since its inception at the end of December in China and entering Indonesia in March 2020 has had many impacts on the world of employment, including in the realm of education. The COVID-19 pandemic prompted the Minister of Education and Culture of the Republic of Indonesia to issue a Circular Letter of the Minister of Education and Culture Number 4 of 2020 concerning the Implementation of Educational Policies in the Emergency Period for the Spread of Coronavirus Disease (COVID-19). One of the circulars contains instructions for carrying out the learning process from home or commonly referred to as Distance Learning or Work from Home/ WFH (1).

The Minister of Education and Culture of the Republic of Indonesia also publishes a Distance Learning Guide which can be found

on the official website of the Minister of Education and Culture of the Republic of Indonesia. The Distance Learning Guide contains everything that educators must do to implement Distance Learning to pages that educators can visit to support the success of Distance Learning (1). However, the Distance Learning Guide published by the Ministry of Education and Culture does not discuss solutions to problems that may be faced by educators, such as the absence of internet facilities, considering that there are still some areas in Indonesia that have not been reached by the internet network.

Educators face many obstacles that make their productivity decline during the COVID-19 pandemic. The obstacles obtained by teachers during learning in the era of the COVID-19 pandemic include limited knowledge of technology, limited facilities and infrastructure and limited online learning experience (2). According to Seran et al. (2021), the quality of the work of educators has not been satisfactory enough because online learning is currently mostly only through the Whatsapp application which makes students not understand the material presented by the teacher and ultimately affects the satisfaction of the performance of the teaching staff which decreases (3). In addition, teachers also experience difficulties in managing the timeliness of the teaching and learning process during the pandemic. Even though the teacher has directed the students to

collect assignments on time, there are still some who are late in collecting them. The cause of the difficulty in managing punctuality does not only come from the students, but also from the teacher. Teachers sometimes start and end lessons not according to the specified time.

Educators complained about several things as outlined in Basar's (2021) research, including not conveying material properly to students due to network disturbances so that students did not understand the material well, besides that there were also educators who could not operate online learning media because not keeping up with technological developments (4). Furthermore, the teacher will use monotonous learning media such as through the Whatsapp application due to the lack of skills in using varied online learning media. The Whatsapp application is not an application that is specifically intended as a distance learning medium, which of course makes this application have limited features. The teacher will usually send a video or video link for the students to watch and even just order them to read the material in the book. According to Prawanti & Sumarni (2020), this will make students easily bored with the teaching and learning process (5).

Based on research conducted by Indra et al. (2021), educators experience stress during the pandemic triggered by several things, namely financial decline, adapting to new technology and policies, increasing workload

because they receive more questions from students even outside class hours during distance learning, and some play a role double when they have to complete household chores and teach at almost the same time every day (6). Work pressure affect a person's emotions which can lead to disturbances in the level of emotional intelligence which is influenced by environmental pressures (7).

The statement from the Ministry of Education and Culture quoted on the Liputan 6 page, states that only 40% of teachers are technology literate and the remaining 60% of teachers whose ability to master Information and Communication Technology (ICT) is still limited (8). This is closely related to the productivity of teachers' work during the pandemic. Teacher work productivity is work activities in the workplace as effectively and efficiently as possible in the implementation of learning and organizational work in schools that are adapted to work methods and work methods compared to working time and work tools or facilities and infrastructure to achieve work goals by achieving learning targets (9). Research conducted by Ukkas (2017) mentions that the factors that influence work productivity include education level, gender, age, and work experience or work tenure (10). According to Yudianto & Indah (2017) work productivity is also influenced by emotional intelligence .

According to Rudiansyah (2014), employee work tenure has a positive influence on productivity because the longer the employee's work tenure, the more experience they have so that their expertise also increases (11). This means that the more experience employees have, the more performance or output for the company. Another study conducted by Firmansyah (2013) states that workers aged between 20-40 years are workers who have high productivity (12). Emotional intelligence is also one of the factors that affect employee productivity. Based on research by Yudianto & Indah (2017), it is known that the higher the emotional intelligence of employees, the higher their productivity because without adequate emotional intelligence, a person will easily get out of control and cannot develop the potential that exists within them (13).

The COVID-19 pandemic has also had a strong impact on work productivity. The changes experienced by workers from previously working from school to WFH make workers feel pressured, plus if the company or agency where they work does not provide sufficient facilities to work from home (14). SMPN 1 Tembelang is one of the schools that are classified as being affected by the Covid-19 pandemic era. Various different backgrounds ranging from work tenure, latest education level and emotional intelligence make the level of work productivity at SMPN 1 Tembelang quite varied. Researchers attempt to analyze the classification of factors that affect work productivity using the Decision Tree technique

so that appropriate input can be given to job holders at SMPN 1 Tembelang. Decision tree is an algorithmic method to model tree-like decision making. To analyze the classification of factors that affect the level of teachers work productivity can be done with a decision tree. The use of other tests such as regression or correlation will only answer the analysis of the relationship or influence between variables, cannot explain the classification of which factors can simultaneously affect the level of productivity. This is intended in an effort to increase the productivity of teachers for the better. It is hoped that by knowing which group classification has the most significant role in increasing work productivity, interventions can be carried out in certain groups. So, that there is an even distribution of productivity for all teachers with various characteristics, especially in the working area of SMPN 1 Tembelang Jombang.

METHODS OF THE STUDY

The type of research used in this research is analytic observational research with a cross sectional approach. This research was conducted in the period from January 2021 to June 2021 at SMP Negeri 1 Tembelang Jombang. From the calculation of the sampling size according to Hulley and Cummings (2007), an observational study, a sample of 45 people was obtained (15). Data analysis was carried out twice. Determination of the frequency of worker characteristics is carried out using SPSS 21 analysis. Then, Decision tree analysis is carried out which is one of the algorithm methods to model decision making like a tree. The independent variables in this study consisted of age, work tenure, education level and emotional intelligence level. Age classification according to World Health Organization (2013) is divided into three categories, namely: 1) Teenagers (12 years - 25 years); 2) Adults (26 years - 45 years); and Elderly (46 years - 65 years). Meanwhile, the classification of work tenure is divided into three, namely: Short work tenure (<6 years); 2) Medium (6-10 years); and Long (>10 years) (9). While the dependent variable is the level of work productivity of teachers. The level of emotional intelligence was measured using a TEI Que-SF questionnaire with a Cronbach's Alpha value of 0.781. Emotional intelligence is divided into three categories, namely Low (X<90); Medium (90 X<150) and High (X≥150). Work tenure was measured by the respondent's identity questionnaire and the level of work productivity was measured using a work productivity questionnaire which has been tested for validity with a Cronbach's Alpha value of 0.911 which is included in the very high category. This research has obtained an ethical clearance certificate with certificate number 154/II/HREC/2021.

RESULTS AND DISCUSSION

Table 1 shows the age of teachers at SMP Negeri 1 Tembelang at the most is at the age of 46 years to 65 years as many as 30 people (66.7%) who fall into the elderly category. In addition, the distribution of the frequency of teacher work tenure at SMP Negeri 1 Tembelang has the most teachers having long work tenures as many as 37 teachers (82.2%) and 36 teachers (80%) have an S1/D4 education level. In addition, based on the results of the TEI Que-SF questionnaire in this study, the frequency distribution of the emotional intelligence level of teachers at SMP Negeri 1 Tembelang found that the emotional intelligence level had the highest emotional intelligence level (57.8%).

Decision tree is an algorithm method for modeling decision making like a tree. Decision tree analysis carried out in this study was carried out using training data as much as 70% of the total data contained in the database. After obtaining the model from the training data, then the model is analyzed on the testing data as much as 30%. The results of the analysis in the case of worker productivity at SMPN 1 Tembelang, Jombang Regency can be seen in Figure 1.
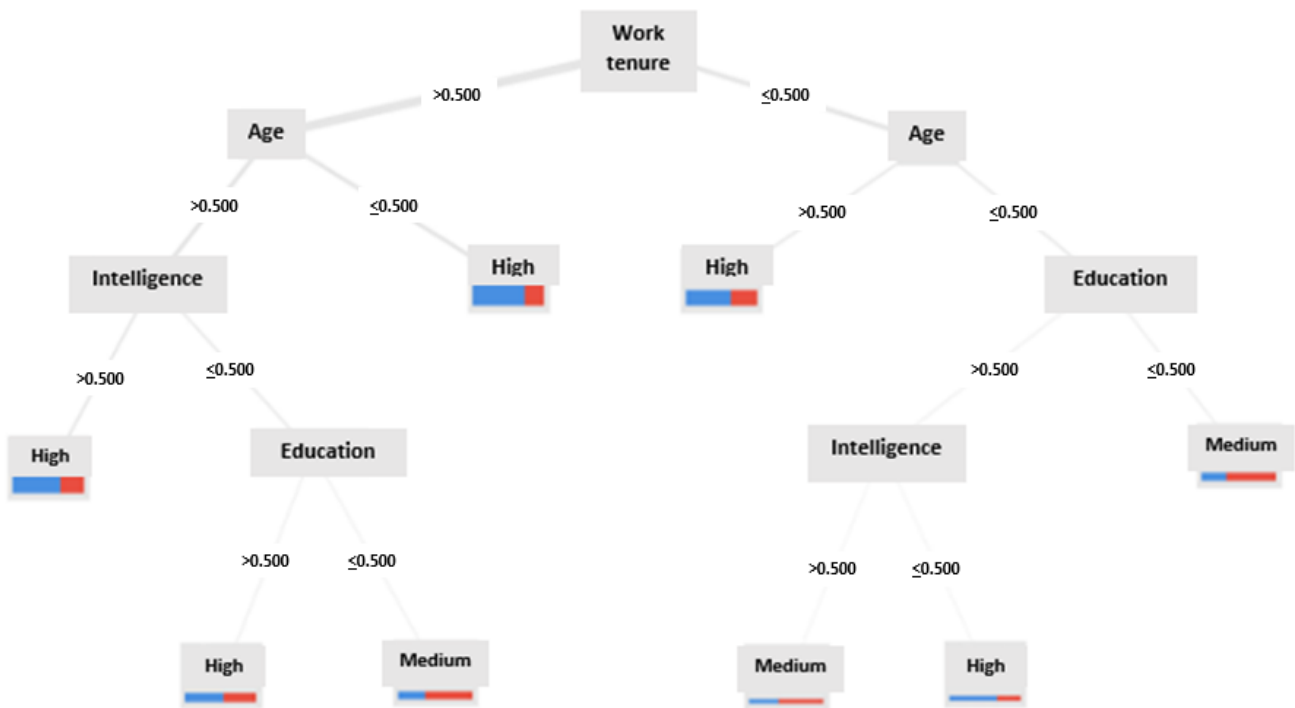

Figure 1. Decision Tree Model for Productivity Selection at SMPN 1 Tembelang, Jombang Regency

Table 1. Characteristics of workers by age, work tenure, education level and emotional intelligence.

Variable	Frequency	%
Age		
Teenagers	0	0
Adult	15	33.3%
Elderly	30	66.7%
Work tenure		
Short	0	0
Medium	8	17.8%
Long	37	82.2%
Education Levels		
Bachelor/ Diploma	36	80%
Magister	9	20%
Emotional Intelligence		
Low	0	0
Medium	19	42.2%
High	26	57.8%

Based on the resulting model, work tenure is the most important variable in determining worker productivity during WFH. The variable work tenure is also included in the base node in determining the decision tree algorithm. Then after a work tenure, there is an age variable that determines the productivity of SMPN 1 Tembelang workers during the WFH period. The details of the decision tree results in determining a person's productivity to be high are described as follows:

1. Long work tenure, adult age (72.9% high productivity; moderate productivity 27.1%).

2. Long work tenure, elderly age, high emotional intelligence (high productivity 66.7%; moderate productivity 33.3%).

3. Medium work tenure, elderly age (high productivity 62.9%; moderate productivity 37.1%).

4. Long work tenure, elderly age, moderate emotional intelligence, master's education (high productivity 53.8%; moderate productivity 46.2%).

5. Medium work tenure, elderly age, high emotional intelligence (high productivity 66.3%; moderate productivity 33.7%).

Based on this description, a predictive model is obtained to determine high productivity in the classification of workers with long work tenures and adults. The predictive value of high productivity is 72.9%. Then the next model is workers with long work tenure, elderly age and high emotional intelligence as well as other models of moderate work tenure, elderly age and high emotional intelligence. The predictive value of the resulting productivity is 66.7%. While the resulting decision tree model to predict the classification of productivity is being described as follows:

1. Long work tenure, moderate emotional intelligence, S1/D4 education (high productivity 36.4%; moderate productivity 63.6%).

2. Medium work tenure, adult age, master's degree education, high emotional intelligence (high productivity 40%; moderate productivity 60%).

3. Medium work tenure, adult age, S1/D4 education (high productivity 33.3%; moderate productivity 66.7%).

Tabel 2. Analysis of Accuracy Model Decision Tree

Classification	True High	True Medium	Class Precision
High prediction	37	19	66.07%
Medium prediction	4	7	63.54%
Class Recall	90.24%	26.92%	65.67%

The results of the accuracy of the model testing generated from the training data to the testing data based on table 2, show that the accuracy value is 65.67%. That is, the model generated in this analysis is high enough to predict both high and medium productivity.

Studies in the field based on Table 1 shows that the age of teachers at SMP Negeri 1 Tembelang is mostly at the age of 46 years to 65 years as many as 30 people (66.7%) are included in the elderly category. The highest productivity tends to be owned by SMPN teachers who are mature (productive) and have a long work tenure. According to Aprilyanti (2017), the productive age is between the ages of 20 to 40 years (16). Age is related to work productivity. The more a person ages, the person will enter a productive age and will experience a decrease in productivity when he gets older due to health and physical factors (17). Research from Novianti et al. (2017) also supports the results of the study, according to her, low work productivity is mostly owned by old age workers and workers who have moderate to high productivity are workers with a young age (18).

Old age workers are workers who have passed their productive age. Van Ours & Stoeldraijer (2011) said the same thing. According to him, age person can affects work productivity (19). Workers over the age of 57 years experience a decrease in work productivity. Around 45% of workers in continental Europe are workers aged between 55-64 years and old age workers have the potential to make the productivity of the continent of Europe decline along with the decline in physical abilities. This impact can be reduced by improving health facilities for workers and providing training (20). Older workers are less likely to continue their education. Whereas education is one of the keys to updating skills and staying at the top of the industry which contributes to being a highly productive and valued employee (21). However, the results of research from Aprilyanti (2017) do not agree with the results of the study. According to her, there is no relationship between productive age and the level of work productivity (16). This is because the research respondents work in parts that are not too complicated so that they do not require special skills. This condition is quite different from field studies which require workers to have new skills and expertise in carrying out

online learning during WFH in the Covid-19 pandemic era.

According to classification factors of work productivity on figure 1, High productivity tends to be dominated by teachers of SMP Negeri 1 Tembelang who have long work tenures. The work tenure of teachers at SMP Negeri 1 Tembelang most of the teachers have a long work tenure (> 10 years) as many as 37 teachers (82.2%). According to Rudiansyah (2014), employee work tenure has a positive influence on productivity because the longer the employee's work tenure, the more experience they have so that their expertise also increases (11). This means that the more experience employees have, the more performance or output for the company. Companies prefer to hire employees with longer work tenures who they believe have high productivity. This is related to skills, time and cost, which means that if the company employs workers with new work tenures, the company must conduct training that takes time and money to improve the abilities of the new employees, while employees with longer work tenures do not need to do it (22). More work experience is owned by employees with longer work tenures. Work experience can influence a person in managing and carrying out their performance and income tasks (23). However, some of another studies that are not in line with the results of the study. Research conducted by Laminia & Muniroh (2018) shows that there is

no relationship between work tenure and productivity (24). This is because the respondents in that study were not concentrated on one job. Respondents in this study on average have more than one job. Employee work tenure in Aprilyanti's research (2017) has no relationship with productivity (16). This is because the work tenure of the respondents is not much different from each other. The average employee has a work experience of about one year which makes their work experience not much different so it doesn't really affect their productivity. Meanwhile, in the case of SMP Negeri 1 Tembelang, the work tenure varies from long to moderate.

Data on figure 1 show that high productivity is also owned by workers with a long work tenure, elderly age but have a high level of emotional intelligence. In this study, the level of emotional intelligence of teachers at SMP Negeri 1 Tembelang found that the level of emotional intelligence had the highest level of emotional intelligence with a value of $X \geq 150$, namely as many as 26 teachers (57.8%) who were included in the category of high level of emotional intelligence. Based on research by Yudianto & Indah (2017), it is known that the higher the emotional intelligence of employees, the higher their productivity because without adequate emotional intelligence, a person will easily get out of control and cannot develop the potential that exists within them (13). Emotional intelligence has a positive influence

on work productivity, which means the better the employee's emotional intelligence, the higher the productivity. Emotional intelligence is needed in doing a job because it affects the way a person communicates with others in order to get harmony in doing something (25).

Studies in the field based on figure 1, found that workers who have not had a long work tenure, are still classified as adults and have a bachelor's degree (S1/D4) education dominate the medium education category. The highest level of teacher education at SMP Negeri 1 Tembelang is 36 teachers (80%) having an S1/D4 education level. Based on research from Nugraha (2017), the education level of workers has a positive influence on work productivity (26). Workers with a high level of education will have high productivity because they have more knowledge that is useful for improving their performance. Education affects the development of human thought patterns and perceptions (27). Subarjo's research (2015) states that the level of education is not related to work productivity (28). People think that education has little effect on the work they do. Unlike the case at SMPN 1 Tembelang, teachers with a Masters/S2 graduate education level have a higher level of productivity. This is related to additional expertise and skills that are increasing when taking new education so that they can help smooth the online education process during WFH in the Covid-19 pandemic era. Gunawan & Amaludin (2021) stated that

educators are expected to have good communication with parents so that student activities can be monitored properly (29). Teachers are also expected to use more diverse learning media so that students do not get bored easily. While Seran et al. (2021) suggest for teachers to be able to divide their time between homework and school, work with parents and guardians of students and develop creativity to use technology for distance learning (3).

CONCLUSION AND SUGGESTION

The resulting model in the decision tree analysis is high enough to predict high and medium productivity. Classification high work productivity is dominated by teachers group who have a long tenure, mature age and have high emotional intelligence. Therefore, it is recommended for schools to conduct training to improve teacher skills and assistance in implementing distance learning, especially for teachers who have a medium work tenure and the elderly who are not accustomed to adapting online learning models.

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