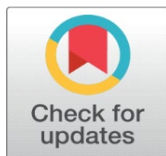


GEOGRAPHIC INFORMATION SYSTEM MAPPING SENIOR HIGH SCHOOL AND VOCATIONAL HIGH SCHOOL IN BALI ISLAND BASED INTERNET BY USING GOOGLE MY MAPS

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ABSTRACT

This study aims to provide information to prospective students and the public about mapping the profiles of SMA (Senior High School) and SMK (Vocational High School) on the island of Bali online through google my map to assist in making decisions in choosing the school as desired because at the time of school selection based on the zoning system. The method used in this study is a field research method which consists of several stages in the flow of analysis, namely Literature Study, Spatial data collection, Internet-based digital map creation using Google My Maps, Integration of spatial data and non-spatial data and implementation. Integration of spatial data and non-spatial data for SMA and SMK in the form of a digital map based on a Geographic Information System using Google My Maps software and a comparison of the number of SMA and a comparison of SMK spread across several regencies /municipalities where almost every regency/municipality has a number of SMA and the number of Vocational High School balanced, based on the results of the analysis that the number of SMA and the number of SMK that are spread out are for SMA and SMK on the island of Bali, namely 179 and 178 with a comparison of about 50.1% for SMA and around 49.9% for SMK. This study focuses on the dissemination of information for high school and vocational schools that are integrated with school profile information packaged in the concept of a Geographic Information System using google my map which can be accessed by prospective new students to decide to choose a school based on the zoning system or distance from where they live.

Keywords: Geographic Information System, Mapping, Senior High School, Vocational High School, Google My Maps



1. INTRODUCTION

Education is one of the processes carried out in preparing quality, creative and innovative human resources [Kosilah and Septian \(2020\)](#). Education can also reflect the strata of human life in society. Indonesia places education as something very important and primary [Sebayang and Tiur \(2019\)](#). In life in Indonesia Education is one of the important factors that must be developed According to Law No. 20 of 2003 Education creates teaching and learning situations and learning paths so that

students can actively develop themselves so that they have religious spiritual abilities, self-control, character, intelligence, noble character and expertise needed by himself, the community, the nation and the State [Renaldi and Anggoro \(2020\)](#).

School is a place to carry out formal educational activities with supporting components such as teachers, educational facilities, students, school environment and so on. The large number of high school and vocational schools on the island of Bali provide opportunities for prospective junior high school graduates and parents of students to choose a school according to their wishes, but not many people know the information about school profiles and become an obstacle for prospective students to choose a school according to their wishes and based on the location of residence because the zoning system is applied in school search. High School (SMA) is a secondary education level in formal education in Indonesia which is carried out after graduating from Junior High School (SMP) or equivalent and Vocational High School (SMK) is one of the educational institutions responsible for creating human resources who have the ability, skills and expertise so that graduates can develop their performance when they enter the world of work [Sarwo et al. \(2017\)](#). Acceptance of new students is based on the sub-district area, so it is difficult for the community (parents) to choose where their children will go to school, because they do not know much information about each school [Sukanto et al. \(2017\)](#).

Based on these problems, a Geographic Information System for high school and vocational high school mapping on the island of Bali is needed based on the internet using google my maps. Geographic Information System (GIS) is an organized collection of computer hardware, software, geographic data and personnel designed to efficiently acquire, store, update, manipulate, analyze and display all forms of geographically referenced information that can be accessed online. online via the web [Surya and Afri \(2020\)](#). Geographic Information System (GIS) consists of three terms, namely System, Information and Geographic is a set of components or elements that are interconnected between these components/elements to achieve goals [Prahasta \(2014\)](#). Google my map is part of a computer-based Geographic Information System (GIS) that is used to process and store geographic-based data or information [Lasut \(2020\)](#). Google Maps was introduced in February 2005 and revolutionized how maps are on the web, namely by allowing users to drag maps so they can navigate [Natalia et al. \(2020\)](#). The purpose of this research is to provide information to prospective students and the public regarding online mapping of high school and vocational high school profiles on the island of Bali to assist in making decisions in choosing the school as desired. The method used in this research is field research which consists of several stages: literature study, spatial data collection, non-spatial data collection, internet-based digital map creation, integration of spatial and non-spatial data, the last stage is implementation. The software used in making the application is the Windows 10 operating system, Google My Maps and the Google Chrome browser. This research is expected to be able to produce internet-based digital maps that display spatial and non-spatial integration of high schools and vocational schools on the island of Bali so that this information can be accessed by prospective students in particular and the community in general through map links that can be distributed via Facebook, WhatsApp, email, twitter and other social media.

2. MATERIALS AND METHODS

2.1. EDUCATION CONCEPT

Education is a conscious effort to prepare students through guidance, teaching and/or training activities for their future roles. Education is guidance or assistance

given by adults to child development to reach maturity with the aim that children are capable enough to carry out their own life tasks without the help of others [Kosilah and Septian \(2020\)](#). In the current era of globalization, education is very important. Almost all countries place educational variables as something important and primary in the context of nation and state development. Likewise, Indonesia places education as something very important and primary [Sebayang and Tiur \(2019\)](#).

2.2. CONCEPT OF GEOGRAPHIC INFORMATION SYSTEMS

Geographic Information System (GIS) consists of three terms, namely System, Information and Geographic which is a set of components or elements that are interconnected between these components/elements to achieve goals [Prahasta \(2014\)](#). The concept of information is the result of data processing and geography is the study of the earth's surface. The concept of Geographic Information System (GIS) is a collection of components that interact with each other in data processing to produce geographic information whose implementation is in the form of digital maps. Geographic information system can also be defined as an information system that can analyze, store, update, integrate and display all forms of information related to the earth's surface.

2.3. CARTOGRAPHIC CONCEPTS

Cartography comes from the Greek karto or carto which means surface and graft which means picture or shape. So that cartography is a picture of the earth's surface. In another sense, cartography is the science of making maps [Andi et al. \(2018\)](#). According to the International Cartography Association in 1973, Cartography is the art, science and technology of making maps, as well as covering their study as scientific documents and works of art.

A map is a picture of the earth's surface projected onto a flat plane with a certain scale. The function and purpose of making a map is to show the position or location on the earth's surface, show the size (area, distance) on the earth's surface, describe the shape of the earth's surface, present data on the potential of an area, communicate spatial information, store information, assist work (road construction, navigation) , planning) and spatial data analysis (volume calculation).

2.4. GOOGLE MY MAPS

Google is a company that started as a search engine and is now growing to expand its services with more than 50 internet services and products such as Gmail, maps to software for smartphones and tablets. Google was founded by Larry Page and Sergey Brin while still students at Stanford University. They both hold 16 percent of the company's stock. They made Google a private company on September 4, 1998.

Google Maps is a web mapping service developed by Google. This service provides satellite imagery, street maps, 360° panoramas, traffic conditions, and route planning for traveling by foot or car. Google Maps is a mainstay for quick searches for locations related to daily needs, as well as for exploring many new places without the need to ask a lot of people around. Its features include sharing those locations. Google Maps was introduced in February 2005 and is a revolution in how maps are on the web, namely by allowing users to drag maps so they can navigate them [Natalia et al. \(2020\)](#).

2.5. METHODS

The method used in this study is a field research method which consists of several stages in the flow of analysis as follows.

1) Literature Study

The first stage is reading reference books and journals related to the concept of Geographic Information Systems, cartographic concepts, the concept of google my map and so on.

2) Spatial data collection

The second stage is to collect spatial data, namely geographically referenced data on the representation of objects on earth, in this case collecting the locations of SMA and SMK on Bali Island.

3) Collection of non-spatial data

The third stage is collecting non-spatial data and analyzing the data by identifying entities and attributes that can be described using ERD (Entity Relationship Diagram) diagrams.

4) Making internet-based digital maps using Google My Maps

The fourth stage is to start making maps of SMA and SMK locations on the island of Bali by grouping data using layers on Google My Maps.

5) Integration of spatial data and non-spatial data

The fifth stage is to input non-spatial data for each of the layers that were created in the fourth stage. Each attribute that has been previously identified will be converted in the form of fields in the tables of each layer.

6) Implementation

The implementation stage is the last stage in this research, namely implementing digital maps using Google My Maps which can be shared/shared in the form of links that can be shared via social media such as Facebook, WhatApp, Twitter and so on so that maps can be accessed online.

Figure 1

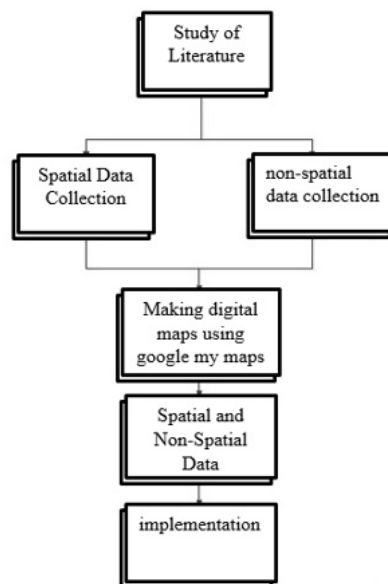


Figure 1 Research Flow

3. RESULTS AND DISCUSSIONS

3.1. IDENTIFICATION OF SPATIAL DATA AND NON-SPATIAL DATA

The results of the research in identifying non-spatial data for SMA and SMK schools in each regency/municipality in Bali are shown in [Figure 2](#) in the form of a digital map as a result of identifying spatial data. Geographic Information System (GIS) is an information system that can analyse spatial data and non-spatial data obtained in data collection, the spatial data and non-spatial data are processed and integrated in a computerized manner so as to produce geographic information to achieve user goals and needs. Spatial data is data that has an overview of the area on the earth's surface which is represented in the form of graphs, maps, images in digital format in the form of rasters and vectors with a certain value [Supuwingsih, et al. \(2022\)](#).

Figure 2

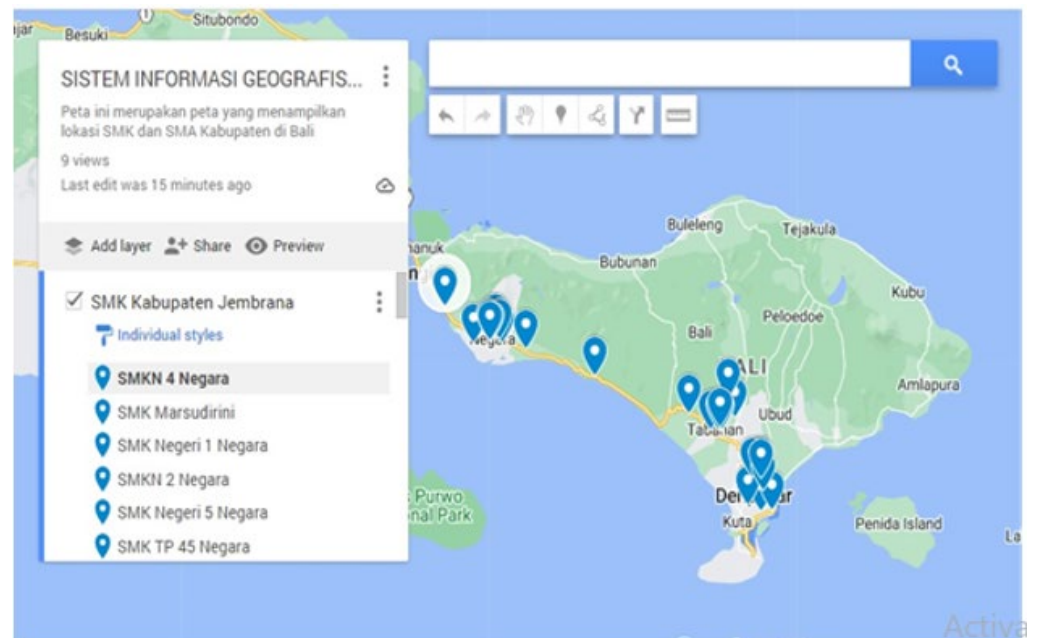


Figure 2 Digital Map Using Google My Maps

Non-spatial data is data in the form of attributes from spatial data. Attribute data is table data containing information that describes the existence of objects in spatial data [Fernando et al. \(2018\)](#). The integration between spatial data and non-spatial data implemented on Google My Maps can be seen in [Figure 3](#).

Figure 3

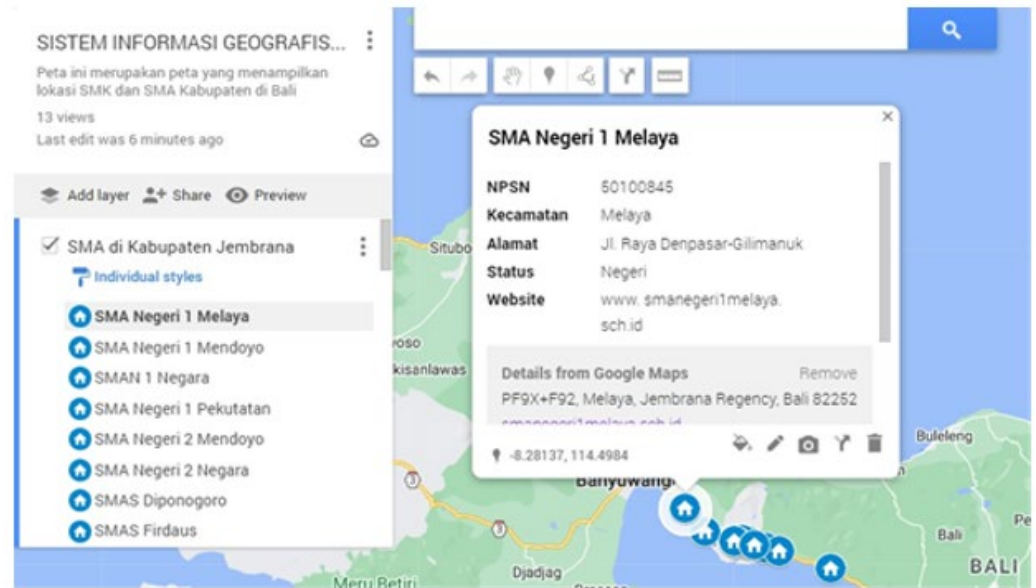


Figure 3 Integration of Spatial Data and Non-Spatial Data on High School Distribution in Jembrana District

3.2. ERD (ENTITY RELATIONSHIP DIAGRAM)

Non-spatial data that has been identified from the mapping of SMA (Senior High School) and SMK (Vocational High School) which are spread from all districts/municipalities on the island of Bali consist of 3 entities namely district/kodya, SMA and SMK. Each entity has several attributes, the regency entity has the attributes of district id (id_kab), district name (Nm_Kab), capital city (ibu_kota), area and coordinates. The SMA entity has the attributes NPSN (National School Identification Number), SMA Name (Nm_SMA), district, address, status and website. The SMK Entity has the attributes NPSN (National School Identification Number), SMK Name (Nm_SMK), district, address, status and website. The cardinality of district entities with SMA entities is one to many with a "has" in Indonesian language "memiliki" relationship and district cardinality with SMK entities is one to many with a "has" relationship, the ER diagram is shown in [Figure 4](#).

Figure 4

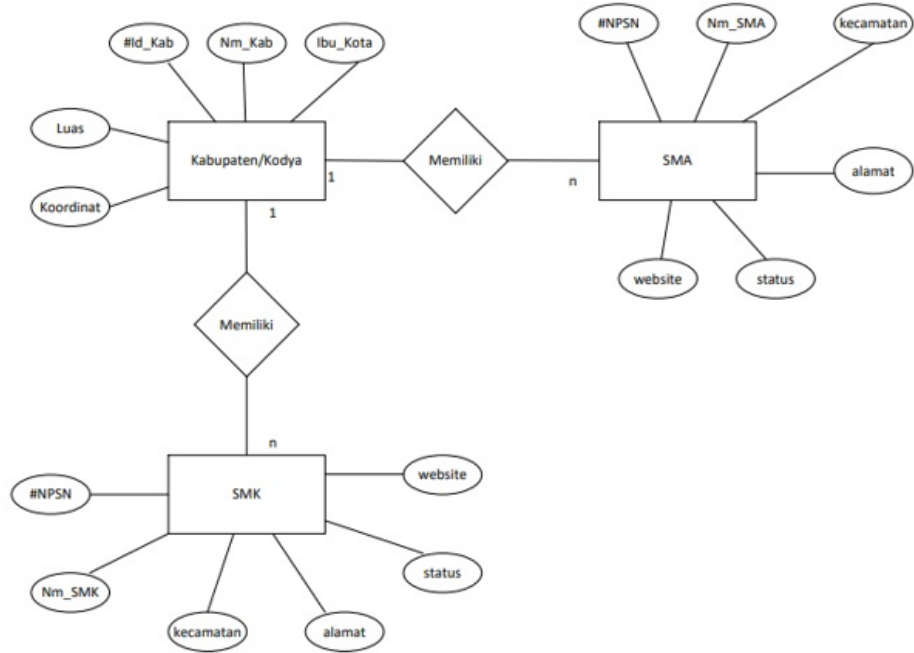


Figure 4 ERD (Entity Relationship Diagram)

3.3. ANALYSIS RESULTS

The data analysis technique used in this study was to use quantitative analysis techniques by grouping SMA and SMK spread across Bali by district and calculating the number of SMA and SMK spread as well as carrying out a process of comparing the distribution of SMA and SMK on Bali Island, comparing the number SMA and SMK can be seen in the following [Table 1](#).

Table 1

Table 1 Comparison of the Number of SMA and SMK in Each Regency/City			
No	Regency/City	Number of SMA (Senior high schools)	Number of SMK (Vocational High School)
1	Jembrana	13	9
2	Tabanan	17	17
3	Badung	22	23
4	Gianyar	17	32
5	Bangli	9	14
6	Klungkung	13	8
7	Karangasem	20	13
8	Buleleng	36	30
9	Kodya Denpasar	32	32
	Total	179	178

Comparison of the number of high schools spread across 8 districts and 1 municipality/municipality of Denpasar can be seen in figure 5. The highest number

of SMA is in Buleleng Regency, namely 36 SMA, around 20% and the least number of SMAs are in Bangli Regency, namely 9 SMA, around 5%.

Figure 5

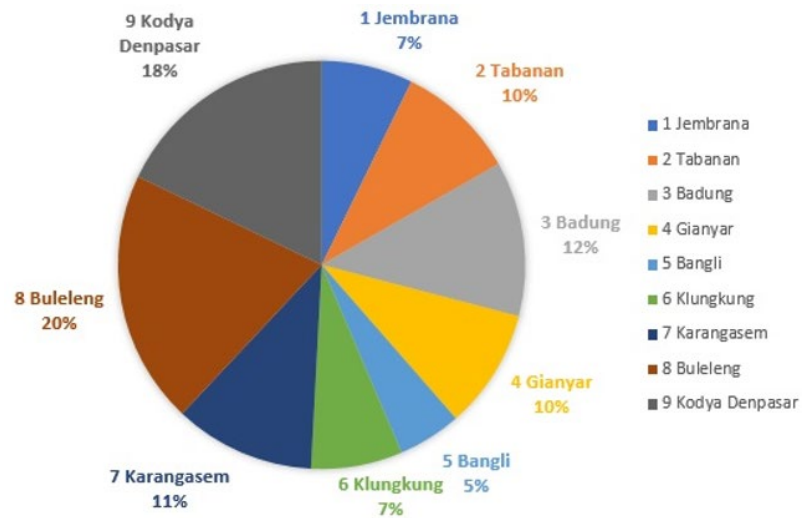


Figure 5 Graph of Comparison of the Number of Senior High Schools (SMA) on the Island of Bali

Comparison of the number of SMK spread across 8 districts and 1 municipality/municipality of Denpasar can be seen in figure 6. The highest number of Vocational Schools is in Gianyar Regency and Denpasar Municipality, each of which is the same, namely 32 Vocational Schools, around 18% and the least number of Vocational Schools is in Klungkung Regency, namely 8 Vocational Schools, around 4%.

Figure 6

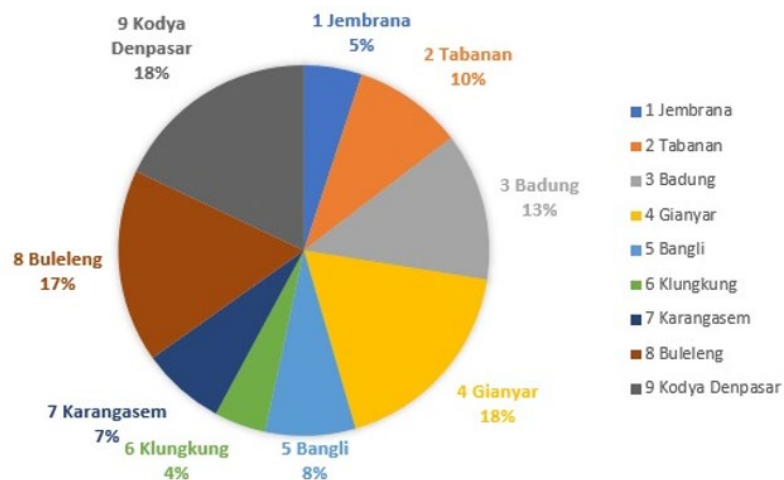
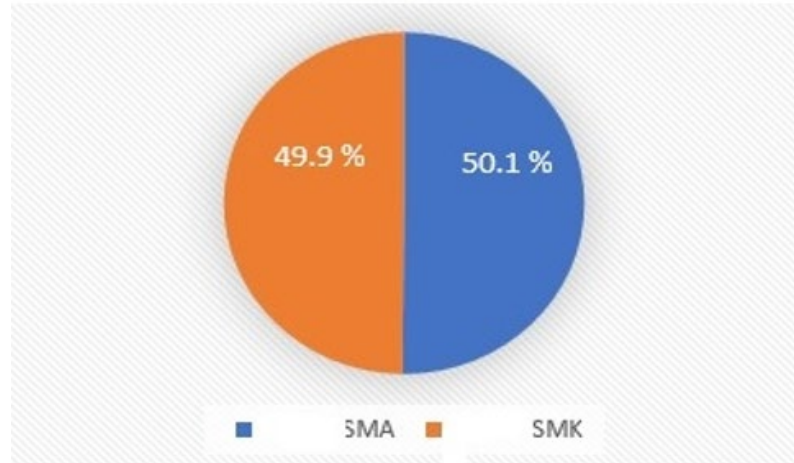


Figure 6 Graph of Comparison of the Number of Vocational High Schools (SMK) on the Island of Bali

In **Figure 7** is a comparison between the number of SMA and the number of SMK spread across several districts/municipalities on the island of Bali, based on the results of the analysis that the number of SMA and the number of SMK spread is for SMA and SMK on the island of Bali respectively 179 and 178 with a comparison about 50.1% for SMA and around 49.9% for SMK, so the distribution of SMA and SMK is almost the same in all districts/municipalities on the island of Bali.

Figure 7**Figure 7** Comparison of the Number of SMA and SMK in Bali Island

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of research on the distribution of high schools and vocational schools in all districts/municipalities (kodya) in all regions of the island of Bali which have been grouped by district. Data grouping is also based on the type of school, namely the type of Senior High School (SMA) and grouped by Vocational High Schools in each district/municipality on the island of Bali. Data processing uses quantitative analysis techniques by comparing the number of SMA and SMK in all regencies/municipalities in the province of Bali.

Comparison of the number of high schools spread across 8 regencies and 1 municipality/municipality of Denpasar with the highest number of high schools in Buleleng Regency, namely 36 high schools, around 20% and the least number of high schools in Bangli district, namely 9 high schools, around 5%. Comparison of the number of SMK spread across 8 regencies and 1 municipality/municipality with the highest number of SMK being found in Gianyar Regency and Denpasar Municipality, each of which is the same, namely 32 SMK, around 18% and the least number of SMK is in Klungkung Regency, namely 8 SMK, around 4%.

Comparison of the number of SMAs and the ratio of SMKs spread over several regencies/municipalities where almost every district/municipality has a balanced number of SMAs and the number of SMKs except for Gianyar district which has a larger number of SMKs compared to SMA, namely 32 : 17. The ratio between the number of SMAs and the number of SMAs Based on the results of the analysis, the number of SMAs and the number of SMKs spread across the island of Bali is 179 and 178 respectively with a ratio of around 50.1% for SMA and around 49.9% for SMK. The results of implementing the digital map for high school distribution can be shared with everyone who is connected to the internet such as social media Facebook, Twitter, Instagram etc. by clicking on this link <https://cutt.ly/yX9ouPZ> and the results of implementing this digital map for SMK can be shared with everyone those connected to the internet such as social media Facebook, Twitter, Instagram etc. by clicking this link <https://cutt.ly/TX9iSaa>. Google Maps will make it easier for users to find SMA/SMK locations and make it easier to get SMA/SMK information [Kharistiani and Aribowo \(2013\)](#).

CONFLICT OF INTERESTS

None.

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