

# Integrity Modeling - A Study Among Malaysian Academic Management Officers

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**Abstract—** This study is regarding to understand integrity among Malaysian academic management officers of the Kedah State Education Department (KSED). Integrity is no longer a foreign word to us. It is a concept that reflects the superior quality that exists as a whole and integrated based on ethics and ethical reflection in day-to-day actions. It embodies the values, ethics, principles, discipline and method which should be consistent with the law. In order to achieve our national vision 'Wawasan 2020', the public sector in particular education officials should have high integrity. Therefore they will be able to elevate education in line with the country's vision. However there are reports that some officers cannot perform their tasks well. Based on past studies, researcher indicated many factors, which can affect one's integrity. Thus, the focus of this study is to find a scientific explanation of the relevant issues as well to develop a model for education officer's integrity using data mining techniques. The respondents were among academic officials of KSED and Kedah Districts Education Department (KDED). The dataset will be analyzed to discover the knowledge by using association rule technique namely *Apriori*. The findings can be used by KSED as a guideline to make the necessary actions to improve the integrity values among staff in KSED and KDED.

**Keywords-** integrity model, academic management, education

## I. INTRODUCTION

Education sector plays a very important role in achieving government's aspiration to become a developed nation by the year 2020. The objective of making Malaysia as a center of educational excellence in the asia region and also internationally in the 21st century requires a country to build excellent image and quality of education to obtain the status of "World Class Education". As a mover and catalyst progress, education staff from lower levels through to the highest level should be united, aware of current developments, have self-esteem and high integrity. The high integrity officer will be able to increase the quality of work and productivity is ultimately realizing the national vision.

Tun Abdullah bin Ahmad Badawi as a former prime minister was emphasized in his speech at the OIC Conference On Human Capital Management in Kota Kinabalu, Sabah on how necessary the public officers to increase and reached a stage of high efficiency and integrity. These elements are a determining factor to the glory of the country to compete in this competitive edge [11].

As the information and communication technology rapidly grows, officers are equipped with computers and internet in order to compete with the best in the line motto of "CLEAN, EFFICIENT and TRUSTWORTHY". However, the integrity violations become even more challenging. Lack of integrity solution in the organization has led this project to explore the development of integrity model, especially in Kedah State Education Department (KSED).

## II. PROBLEM STATEMENT

This study focuses at the issue of "integrity breaching" among academic officials, particularly in Kedah State. The academic officer is referring to individuals who originally was a school teacher, but now serves in KSED or Districts Education Department (DED). They are no longer conducting a teaching session but instead carry out administrative works and consult teachers in schools.

Several cases of ethical violations and crimes have been reported among education officials. Among them, Berita Harian dated October 20, 2012 reported that based on monitoring conducted by the Department of Public Service (JPA) and information from the public found that many civil servants went out for shopping during working hours of Ramadan. Moreover this phenomenon appears to be occurring in most of the country. Based on this issue, Datuk Omar Osman as Cuepacs president said each officer or member of the public servants must abide by the rules and did not take the opportunity to come back earlier than the time set.

Meanwhile in Alor Setar, Anti-Corruption Agency (ACA) was investigated various alleged irregularities and abuse of power involving 14 public servants [12]. The statement was endorsed by the State Secretary, Datuk Syed Unan Mashri Syed Abdullah. He added, 18 disciplinary cases involving Kedah's officers has been charged from 2005 to this year, including 10 civil servants dismissed.

The Star dated 21 July 2009 have been reported on the provision of financial mismanagement have been done by Ponder Lodah whom was alleged to have committed the offense of being to have knowingly used for Government Purchase Orders (LO) containing false details with the intention of deceiving the state Education Department, in which he acknowledged the receipts of 400 dictionaries and workbooks that had not been supplied to the school. On April 15, 2008 the same newspaper reported about the false claims

made by Beaufort district education officer totally cost RM5600 over the charter of four buses to transport 39 students to Sandakan district from May 2 to May 5, 2004 for a table tennis tournament when such a trip never took place. Discipline problems among KSED officers is summarized in Table 1.

Table 1. Discipline Problems Among KSED Officials 2012

No.	Cases	Percentage (%)
1	Absent from duty without informing the administrator	0.5
2	Fail to submit daily planning records more than two weeks	5.0
3	Late to work	5.0
4	Disobedient of instructions	0.5
5	Abusing the medical leave	2.0

There is only one counselor who works in KSED. It is similar to DED. Furthermore, the counselors are also assigned to guide school counselors in the state of Kedah which total 721 schools with the number of teachers up to 34,000 people. Due to the small number of counselors compared with the number of clients, counseling sessions can't be carried out properly.

Although the KSED and the District Education Offices (DED) possesses a counselor, the absence of a proper mechanism and the small number of counselors lead difficulties for the department to identify exactly which officials have broadly lower integrity to be given a counseling session. As a result, possibility of miss selected academic officers to attend a counseling session is high. Therefore objectives of the department will fail and consume large operating cost.

Based on the above statement, it is found that there are some academic officials who have a low level of integrity. Such officer, of course will not be able to improve the education of excellence infect more to be taken as a role model by teachers and community members. Therefore, the focus of this study is to understand the characteristics of high integrity officer and to build a model of integrity that fits the KSED needs by using data mining technique.

The study is expected to assist the KSED to identify and predict the low integrity officers to join the course or undergo a counseling session. In order to model the integrity, it should be able to answer these questions: i) what variables influence the integrity of KSED academic staffs?, ii) how to design and develop the integrity model?, and iii) how to determine the success of the integrity model? The study aims to understand integrity and develop an integrity model for KSED. Specifically, the objectives: i) to identify the variables which

influence the integrity of academic management officers of KSED, ii) to establish an integrity model using the association rule technique, and iii) to evaluate the effectiveness of the integrity model for KSED.

### III. LITERATURE REVIEW

The literature has been reviewed in order to highly understand the integrity approach in an organization. The integrity value considered within the study areas are: moral, ethic, and integrity. All these values will relate to the integrity model, which is focused on this research.

#### A. *Morale*

Morale is how we judge others meanwhile values refer to nature rules hold by individual, committee or an organization. Moral values reflex one's nature which is accepted in the community or organization<sup>1</sup>. Moral values determine the standards of good-bad or evil, right-wrong and acceptable or not acceptable which govern an individual's behavior and choices. Morality may vary between individuals, communities and nations. It depends on the principles of the group. For a group of thieves stealing is an admirable value and vice versa if not stealing ones would be considered immoral by other members. There are several factors contributing to the formation of a moral person. Perhaps the most significant influence is the value of the individual him selves. In addition, other factors that are not less important are the local belief, the influence of society, religion and government intervention. Therefore morality may change as the laws and morals of the society change in accordance with time and changing in human civilization.

#### B. *Ethic*

The ethic is a collection of individuals in a person's value. For example teachers' ethics means value and stringent guidelines practicing by teachers respectively. It led them to distinguish right-wrong, good-bad, what should and can be done and what should not be and can't be done. Ethics significantly formed by the religious and personal social education in the stand of formal education or through non-formal experience. The ethic is fundamental to the formation of organizational integrity. It impacts directly on each individual. Ethic can also be classified as a collection of moral values and standards for assessing the behavior of individuals, organizations and professions. However, ethics only consider good values instilled in an organization and become as a universal acceptance among the group members. If there is an even better value but not accepted by the members of an organization, it can't be accepted as an ethical element to the organization. For example, wearing the hijab is a good thing and is compulsory for a Muslim woman. However, it can't be taken as the ethics of civil servants because our employees are from different races and religious affiliations. In an organization, ethics considered as the set of good values held by the organization such as clean, efficient, trustworthy,

<sup>1</sup> <http://prpm.dbp.gov.my/Search.aspx?k=moral>

conscientious, responsible, consider working as a worship and friendship.

### C. Integrity

Integrity is defined as honesty, wholeness and excellence. Someone who has the characteristics of a universal self-perfection is claimed to be a high integrity person. Integrity related to cultural aspects. It is triggered and become as a product of culture in a reality form. To be a person of high integrity, one must have good character and highly discipline. An employee with integrity will always refer to the manual procedures while ensuring that the action taken is in line with the company's standard operating procedures. Our Prophet Muhammad says, "the human most grief (as punishment) on the Day of Judgment is a person who strives to find the wealth which is not 'halal', then the property will take him to Hell" (Narrated by Al-Bukhari and Moslem). The 'hadith' refers to the violation of individual rights and credibility thus refers to low integrity. [13] defines integrity as a superior quality that exists as a whole and cohesive. It is based on ethics and ethical reflection on day-to-day actions. National Integrity Plan (PIN) defined individual integrity as consistency between what was said and in town, between the action and the morality, ethics and the law, self-interest with the public interest. A person claims has a high personal integrity value if he has all the features mentioned. Conversely, if he does not have these characteristics, he will be considered as a low integrity person. The integrity of an organization is reflected in the formulation and implementation of the code of ethics, charter, systems and work processes, and compliance with best practices. Code of ethics for the organization noted, repeated and internalized by members of the organization to become a habit and culture of the organization. Someone who commits with the code ethics is considered as high integrity members of the organization. Integrity can be characterized as a description of the nature of individual and perfect organization noble values like honest, truthful, trustworthy, fair, responsible, transparent, efficient and wise. Berita Harian dated 7 February 2007 has reported Datuk Dr. Radzi Abdul Latif has stated that integrity is a value that starts from within our inner self. It grows from nature consciousness and from hearts, and then seeped into the minds and emotions. Finally integrity exhibited by the physical action through behavior.

National Integrity Plan [13] defined an easy term to determine the nature of an official act either integrity or not; "do not take an action to the client what you don't like to be done to you if you are in their place". In conformity with the statement, Chief Secretary's statement in The STAR dated January 29, 2010 pointed out that obstacles due to bureaucracy is our own creation. If we don't have the commitment and intention to ensure success, we will work hard to ensure the annual obstacles are eliminated. Values of integrity can be measured within the limits of knowledge, attitudes and behavior. Integrity is the projection related to the nature of professionalism, disciplined, responsible, civic leadership, diligent, patient, optimistic, creative and innovative. Therefore, to enable the country to achieve its vision of becoming a developed nation, officials at all levels should have high

integrity and professionalism. Tan Sri Mohd Sidek Hassan has quoted "... lets say there is a civil servant who do not extort or ask for bribes. Even if he doesn't do any of these, but he slacks in his work, then to me, that is not having integrity". This explained about the importance of integrity values for government staffs.

### D. Integrity Model

Based on the Al-Quran, hadith and ulema note, the higher the value of personality integrity is our beloved Prophet Muhammad. He is known for his admirable traits since childhood where he adheres the title of Al-Amin. [1] in their article entitled "Where Leadership Begins - A New Model of Integrity", has brought forward a new model based on the principles of integrity, morality, ethics and legality as shown in Figure 1. These four principles are mutually closely pertaining in our daily lives. According to the researchers, these four principles normally were grouped in two realms within distinct and separate domains. Integrity exists in the positive without normative content meanwhile morality, ethics and legality exist in a normative field of glory but in another domain. Furthermore, they suggested that the four phenomena are combined squarely to form a new model of integrity. The article was presented in many places began with a presentation at the Gruter Institute Conference On Values in June 2006 until the last time on January 31, 2011 at Wake Forest University Schools of Business.

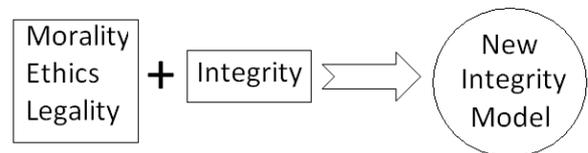


Figure 1. New Integrity Model According to Werner et al. (2007)

## IV. METHODOLOGY

A well-establish methodology mostly used by researchers to gain information about certain problem is a questionnaire. However, questionnaires can't be implemented in all research areas, such as a qualitative kind of research. For that scenario, an observation, interview and document reviews are more tolerating to expose the problem rather than questionnaires. Since the scope of the study is quite small, the researcher chooses an interview, observation and document review to understand the problem. Meanwhile, questionnaire is used to obtain sampling data from the target group and subsequently used to develop a model of integrity mentioned. To understand the situation, the researcher interviewed some officers of KSED and KDED which are comprised of outstanding officers in their respective departments. These officers are Tn. Haji Asmee bin Tajuddin, the Chief Academic Management Sector of KSED and Mr. Mahadir bin Ismail, Excellent Officer of KSED who is the backbone of department policy planning and responsible for the academic enhancement program in the state. Based on these interviews, the researcher can understand the

characteristics of integrity values, which clearly disclosed by the officials concerned. As an academic officer of KSED, the researcher also performed an observation by him selves. Upon his experiences, the integrity of the officers is varied and can be seen clearly through their working experience and behavior. In addition, the issues and additional information were obtained through reading materials and related documents such as working papers, reports and education journal. In this study, the researcher used the knowledge discovery in database approach [14] to solve the problem. The workflow covers the process of obtaining data, data preprocessing, mining, model construction and finally a prototype development as depicted in Figure 2.

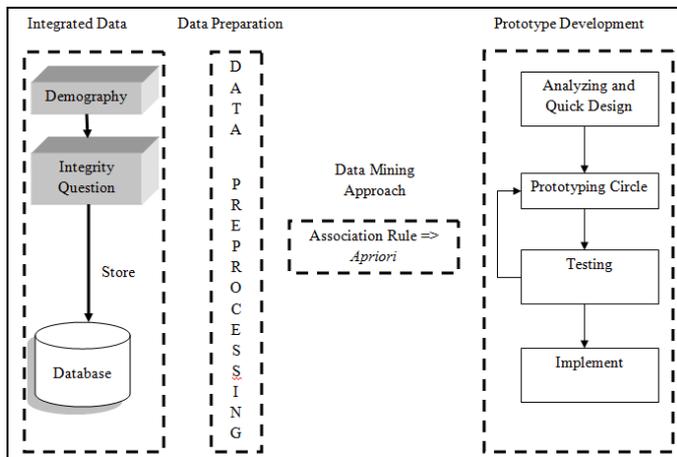


Figure 2. Methodology for developing Integrity System

Figure 2 illustrated the process flow of this study. It was divided into 4 phases, which are: Data Integration, Data Preparation, Data Mining, and Prototype Development.

A. Data Integration

The first phase of the methodology used is data integration. During this stage, the re-researchers should start with digging-out as much information about the research subject. Hence, in this research situation it is about integrity in education management. The process involved identifying target groups, develop appropriate measuring tools, collect raw data, record the data and store it in a database to be analyzed later.

B. Data Preparation

The second phase of this methodology is data preparation or well known as “Data Pre-Processing” stage. During this stage, the researchers should start by isolating the complete record with incomplete ones. Any form of huge outlets shall be removed. If there are small quantities of missing values, it can be corrected using legitimate statistical methods without affecting the dataset quality. But if the jargon is too large, then the record should be removed from the dataset. In conclusion, the aim of this phase is to get a high quality and clean data because low quality data can affect the mining result thus resulting a wrong result.

C. Prototype Development

This section also represents the development of Integrity System. It covers the process of obtaining experiment data, analyzing the association rules and finally develops the system using Java. The data mining technique will be used in developing the system to diagnose the education officer’s integrity.

D. Data Mining

Data mining has been used in various fields and applications. For example, it is used in medicine, insurance, banking and retail. The technique used is able to reduce costs, increase sales and improve research. Data mining is also used as a method to detect fraud and non-compliance in order to measure and improve performance. It also a systematic data analysis tool to discover unknown information from a huge amount of data sets. It can gather a number of required information such as patterns, observation, theoretical models, a set of rules and relationships. All agreed upon who explain data mining as a technique to finds hidden knowledge, unknown patterns and new rules from large amounts of data or data repository. Data mining techniques comprise a number of tasks depending on the training set used. Each task produces different sets of knowledge. Commonly used techniques are association rules, clustering and classification. Since the study focuses on association rules, the next section will be explained in detail about association rules. [2] Define association rules as an unsupervised learning method used to capture associations between groups of items. The goal of the techniques described is to detect or find the precise relationship between the items in a data set. It is a common task in data mining which is used in various fields. The method used to gather a good association rule is called Apriori Algorithm. It is really useful in building regression and classification trees. The Apriori Algorithm is the most influential algorithm for mining frequent item sets of Boolean association rules. By using the method, the dataset will be mined to find a good relationship or correlation between each data. The discovery of relationships among huge amounts of business transaction records can help loss leader analysis, cross-marketing, brochure design and other business decision making processes.

V. DEVELOPING INTEGRITY MODEL

The first stage accounted to be data integration. During this stage, the researchers should start with digging-out as much information about the research subject; in our situation it is about integrity in education management. The process involved identifying target groups, develop appropriate measuring tools, collect and record the findings of the study be analyzed. Respondents consisted of two hundred and twenty KSED and KDED academic officers. Distribution of respondents is shown in Table 2.

Table 2. Distribution of Respondents

Department	Male	Female	Total
Academic Management Unit	26	4	30

PPD Baling Sik	25	4	29
PPD Kota Setar	27	5	32
PPD Kuala Muda Yan	28	6	34
PPD Kubang Pasu	18	4	22
PPD Kulim Bandar Baharu	26	3	29
PPD Langkawi	18	0	18
PPD Padang Terap	18	0	18
PPD Pendang	7	1	8
PPD Baling Sik	25	4	29
<b>TOTAL</b>	<b>193</b>	<b>27</b>	<b>220</b>

Table 2 shows the distribution of respondents involved. Respondents were academic officers of KSED and KDED covering officers of Kedah Academic Management Sector and all eight districts in the state. A set of questionnaire has been developed to be used as an instrument. It consists of two parts: the first part is about respondent’s demographic information while the second part focuses on questions related to the appreciation of the integrity’s values among the respondents. Demographic information asked is gender, age, place of work, position and salary grade. Meanwhile, questions on the profile of individual integrity are included in the twenty questions that assess the honesty, trustworthiness, diligence, obedience and willingness to take responsibility. The main focus of this phase is to understand the data’s pattern. The researcher used Ms Excel as a base to record the raw data collected from respondents. At this stage, all the respondent’s answers will be recorded in full even if in some cases there are incomplete data or missing value. The total record is 220 records. An example snapshot of dataset recorded is shown in Figure 3.

Figure 3. Screenshot of the data set collected

The second phase of the process is ‘data preparation’ or well known as “Data Pre-Processing” stage. During this phase, the researchers start by isolating the complete record with incomplete ones. The dubious and incomplete records will be discarded. Any form of huge outliers shall be removed. Only records that have only a small missing value is maintained because missing values can be corrected using legitimate statistical methods without affecting the dataset quality. However, if the jargon is too large then the record should be removed from the dataset. The aim of this phase is to get a

quality and clean data because low quality data can affect the mining result thus resulting a wrong result. During this phase, WEKA version 3.6.2 was used to manage and analyses the dataset. Based on Figure 4 (red circle), some of the data set is incomplete or having a missing value. However, WEKA is equipped with the function of filling the incomplete data by inserting the mean or mode depending on the type of the attributes involved. For numerical data, the mean is used while the modes set for nominal data. Figure 4 and 5 shows the process of replacing the missing value using WEKA.

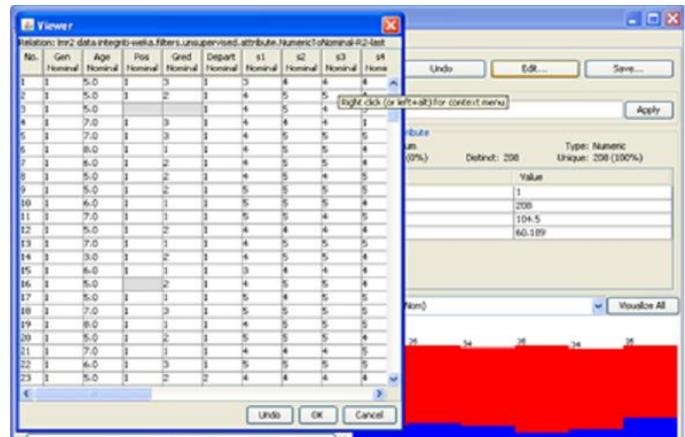


Figure 4. The dataset for missing value

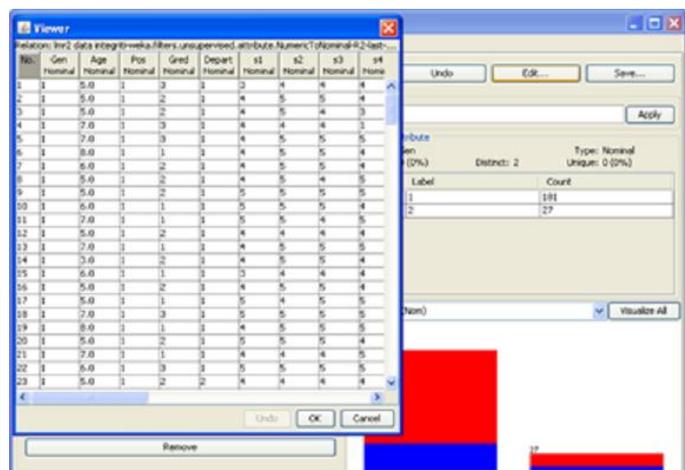


Figure 5. The dataset after replacing the missing value

The third phase involved in the modeling integrity process is data mining. During this phase, the researcher chooses association rule techniques named Apriori which was introduced by Agrawal and Srikant in the year 1994. During this phase, the data set was mined to find the most appropriate rule occurs. It is an innovative way to find an association rule on a large scale of data. Therefore, the mining process shall allow implication outcomes that consists more than one item [15]. The purpose of this phase is to identify the significant factors which effect on the formation of academic officer’s integrity of KSED and DED. In order to use Apriori approach, the researcher must first ensure that the data sets must be in the

form of nominal. It is because; the relationship can't be generated if the variables involved are in numerical form. For this purpose, we can use the facilities provided by the WEKA filtering to convert data from numerical to nominal as shown in Figure 6.



Figure 6. Convert the numerical attributes into nominal type

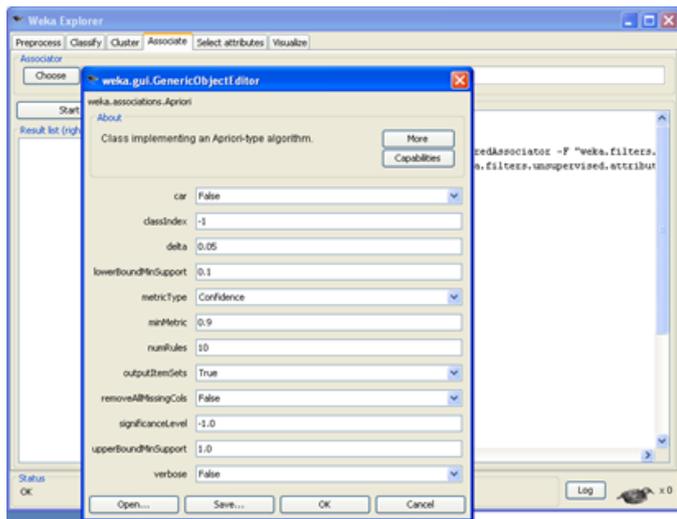


Figure 7: To mine the dataset using Apriori

Figure 7 describes how and what attributes can be changed in Apriori algorithm. However, the researcher chooses 0.9 as the minimum confidence level to evaluate the rules in each training set. In this study, only two attributes are manipulated, which is confidence level and the total number of best rules. In order to find the best rules, the researcher divided the training set (dataset) into five sections. The sections are 5 best rules, 10 best rules, 20 best rules, 30 best rules and 40 best rules. The aim of the process is to find best and accurate rule which affects the KSED and DED academic officer's integrity. Five best rules mean, the dataset is mined to find 5 best rules that can affect the integrity. It's also similar to other sections. From the best rules found in each section, integrity's criteria that had been frequently appeared in all sections will be selected as the best and accurate rule to find the target.

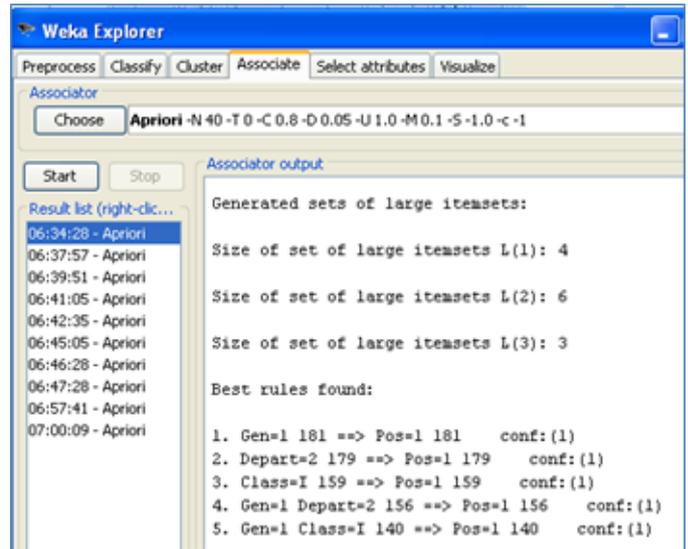


Figure 8. Result for five best rules found

Based on Figure 8, there was only one finding related to the relationship of the official integrity between the officer positions. However, it can't be taken into account because these respondents consisted of an academic officer of KSED and DED whom are categorized as administrative and professional groups.

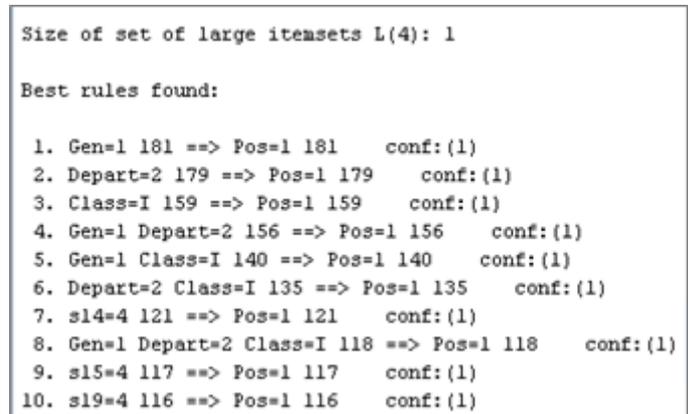


Figure 9. Integrity among male officers

As mention earlier, five folds were created to identify the relationship among the attributes. The data mining process started with generating five best roles with confident level was set to 0.9 followed by 10, 20, 30 and 40 best roles. Figure 8 shows the result of the best five rules generated from this phase. The relationship becomes more dynamic if the rules generation is increased. Based on Figure 9, particularly male officers working in KDED shown higher integrity so as the result of twenty, thirty and forty best roles. If the confidence levels change, then the result will be slightly different. For example, Figure 10 depicted the result of ten best rules if the confidence levels change to 0.8 units or 80%.

1. Gen=1 181 ==> Pos=1 181 conf:(1)
2. Depart=2 179 ==> Pos=1 179 conf:(1)
3. Class=I 159 ==> Pos=1 159 conf:(1)
4. Gen=1 Depart=2 156 ==> Pos=1 156 conf:(1)
5. Gen=1 Class=I 140 ==> Pos=1 140 conf:(1)
6. Depart=2 Class=I 135 ==> Pos=1 135 conf:(1)
7. Class=I 159 ==> Gen=1 140 conf:(0.88)
8. Pos=1 Class=I 159 ==> Gen=1 140 conf:(0.88)
9. Class=I 159 ==> Gen=1 Pos=1 140 conf:(0.88)
10. Depart=2 179 ==> Gen=1 156 conf:(0.87)
11. Pos=1 Depart=2 179 ==> Gen=1 156 conf:(0.87)
12. Depart=2 179 ==> Gen=1 Pos=1 156 conf:(0.87)
13. Pos=1 208 ==> Gen=1 181 conf:(0.87)
14. Gen=1 181 ==> Depart=2 156 conf:(0.86)
15. Gen=1 Pos=1 181 ==> Depart=2 156 conf:(0.86)
16. Gen=1 181 ==> Pos=1 Depart=2 156 conf:(0.86)
17. Pos=1 208 ==> Depart=2 179 conf:(0.86)
18. Class=I 159 ==> Depart=2 135 conf:(0.85)
19. Pos=1 Class=I 159 ==> Depart=2 135 conf:(0.85)
20. Class=I 159 ==> Pos=1 Depart=2 135 conf:(0.85)

Figure 10. Result for twenty best rules using confidence levels as 0.8

## VI. DISCUSSION AND FINDINGS

The integrity dataset which consists of demographic and integrity criteria was analyzed using association approach namely Apriori provided by WEKA software. Demographic information asked is gender, age, place of work, position and salary grade. Meanwhile, questions on the profile of individual integrity are included in the twenty questions that assess the honesty, trustworthiness, diligence, obedience and willingness to take responsibility. The target class specified are Integrity (I) and Not Integrity (N). From the analysis carried out, there was no significant correlation between the integrity with the respondent's demographic information such as gender, age, place of work, position and salary grade. Although there is little relevance between male officers in DED with the integrity value of the officer, it can't be considered because 193 officers or 87.72% of the respondents were men. In addition, the officers are former teachers whom selected through a tough filtration before retaining intact with KSED and KDED. The result of the data mining process has proven that not all twenty variables studied were related to the level of the officer's integrity. Only six variables show a strong relevance. Generally these six variables can be grouped as morality, purity and diligence. Therefore the suggested integrity model for KSED is shown in Figure 11.



Figure 11: The KSED Integrity Model

## VII. CONCLUSION

This study will be able to assist KSED and KDED counselor to identify their targets accurately and easily. The ability to accurately identify the target group will determine the success of counseling sessions conducted while optimizing costs. In addition, the academic staff can use the proposed model to evaluate their own level of integrity. With that, the officer will be able to make early improvements in order to become an effective officer and has a brighter future. In conclusion, the study will benefit the Malaysian education staff, especially in Kedah as they can test their integrity status by using the prototype system. Importantly, this study is expected to provide huge benefits to KSED in particular and the Ministry of Education in general. Moreover, the high integrity academic officers will guide the teachers to improve an educational system in Malaysia.

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