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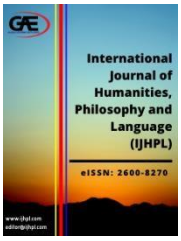

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SCIENCE CLASSROOM PRACTICES IN AN ISLAMIC RELIGIOUS SECONDARY SCHOOL: ADAPTING CLASSROOM ETHNOGRAPHY

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Abstract:

This article is a response to the article "Classroom Ethnography: Adapt or Adopt?" The aim of this article is to guide potential local postgraduates on the coding process for the selected classroom ethnography which is not well understood. Qualitative data collection and data analysis were used from a larger ethnographic study. We explored in-depth the influence that culture has on learning science in an Islamic Religious Secondary School form five science classrooms. The ethnographic fieldwork capturing the informants' beliefs and values central to their distinctive way of life could provide emerging data for understanding the culture sharing group's learning of science in a period of time. The choice of manual coding attempts to describe the nature of science classroom practices at this Islamic Religious Secondary School science classroom. This article presents findings that adapting classroom ethnography is possible. We found that the students' initial sources of cultural influence are the nature of science classroom practices.

Keywords:

Ethnography, Classroom Ethnography, Qualitative Data Analysis, Coding, Sabah

Introduction

The article "Classroom Ethnography: Adapt or Adopt" (Abdullah et al., 2019) argued on the flexibility of classroom ethnography (CE) to be adapted or adopted. The main objective of this article is to present findings that adapting CE is possible. CE is adapted to local settings specific to a particular culture, a particular context. According to Saldaña (2013), each qualitative study is context-specific, and our data are unique, as are we and our creative abilities to code them. The data analysis of the article "Classroom Ethnography: Adapt or Adopt" are presented in this article. To make sense of the data collected, coding is a crucial step. The choices between manual or electronic coding have been discussed by Basit (2003) and Saldaña (2011) and it is concluded that either manual or electronic is dependent on the choice of the researcher (Mariya, 2012; Raktham, 2008).

Coding is a heuristic method, a transitional process between data collection and more extensive data analysis. Coding is a heuristic method of organizing coded data into groups which have similar or share some characteristic. This group is called categories. These generated categories are assigned meanings that will then be clustered under major themes. It is at this higher-level of coding that researchers use their ability to show how several themes interrelate to the development of theory. It is the qualitative inquiry codes-to-theory model meaning an inquiry from the real to the abstract or the particular to the general model (Saldaña, 2013).

This article presents in a simplified way how coding could be done manually. It is certain that many computer-assisted qualitative data analysis software (CAQDAS) are available to render coding raw data manageable. Some local novices would also falsely believe that coding could only be done with CAQDAS. Nevertheless, for a novice researcher to benefit from CAQDAS, the novice has first to understand the basics of coding raw data to themes. CAQDAS does not code the data but merely helps to organize the data (Stuckey, 2015). In addition, the novice needs to comprehend that coding manually is also possible. CAQDAS is a desired accessory, but not compulsory. For some researchers and usually the majority, the cost of CAQDAS could also present a problem (Rodik & Primorac, 2015). CAQDAS is also of no benefit if the novice does not fully understand what coding entails. In this study, using collected data from a larger ethnographic study, readers could follow the data analysis. On the whole, the development from raw data to codes to themes and eventually to theory.

Main Objective

To make recommendation based on the notion that adapting CE could produce conclusive findings through qualitative data collection and analytic processes.

Research Method

This article used qualitative data collection and analytic processes from Abdullah's (2019) ethnographic study. We explored in-depth the meaning influence of culture has on learning science in the classroom of a Malaysian State Religious Secondary school (Abdullah, 2019). The aim elaborates in detail as to describe, to explain, to understand, and *verstehen*. *Verstehen* means human acts are being observed through firsthand intimate understanding (Shaffir & Stebbins, 1991). This study is to describe and analyse the sociocultural phenomena in SMAN-1 State Islamic Religious Secondary School and contribute to understanding about them (Rossman & Rallis, 2012).

The missing piece in the research literature we wish to introduce in our study is not only the area that is underexplored but also a contribution to the literature regarding the coding process

specific to the local context. In this social study, it is the type of informants and their location. We give a descriptive account of our study (Zaharlick, 1992). The appropriate method of ethnographic study which is synonym to ethnographic fieldwork documenting our informants' beliefs and values central to their distinctive way of life (Hammersley & Atkinson, 2007) which could provide emerging data for understanding the culture of a group of people in a period of time. In this social study, we explore the influence of culture in relation to learning science of a group of students in their natural setting, which is their science classroom setting, at an Islamic secondary school located in Sabah, a Malaysian state in the Borneo Island. The research objective is to understand the depth of cultural influence in learning science; hence to describe the nature of science classroom practices at an Islamic Religious Secondary School science classroom. The overarching research question is "To what extent can culture influence learning science at an Islamic religious secondary school science classroom?" In order to answer this question, the study attempts first to discover: What is the nature of science classroom practices in an Islamic Religious Secondary School science classroom? We assimilated and adopted Mariya's (2012) methodological process as seen in Figure 1.

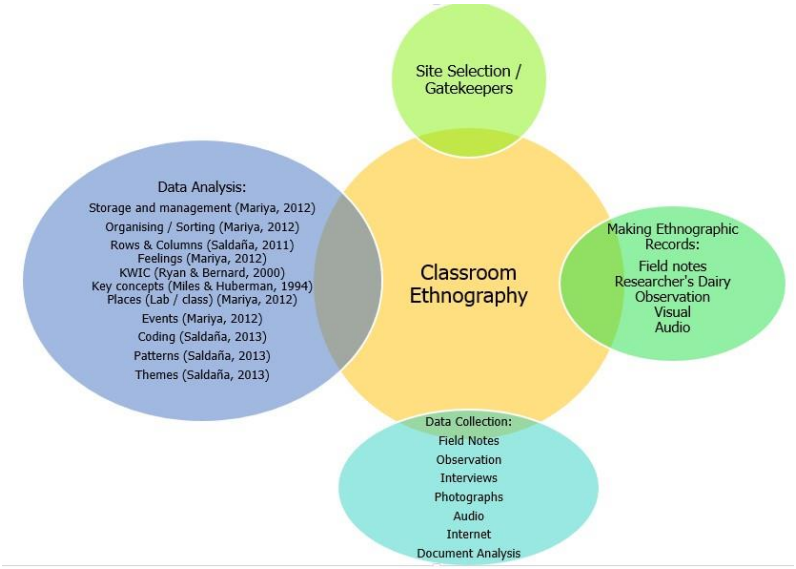

Figure 1: The Methodological Process

Source: Mariya (2012)

The Context Informants' Site

We wanted to study the culture sharing group's learning of science in SMAN-1 Secondary School classrooms. In order to understand in depth a larger society, a small copy of that society could be representative of its larger society (Vidich & Lyman, 1994; Yuenyong & Yuenyong, 2012). We have presented our findings as a narrative (Moser & Korstjens, 2018; Raktham, 2008), hence the context is described in the section Research Findings in the subsection The Context.

Sample Size

The informants in this social study were a group of students in a science stream classroom. The informants' size varies among researchers. In Guetterman's (2015) literature review, he found few reported sample sizes for ethnographic education studies. Instead, the size of the culture sharing group determines the overall sample size (Guetterman, 2015). Guetterman found sample sizes ranging from 6 to 33 for ethnographic education studies but he added that many

ethnographic studies didn't explicitly label the sampling strategy. In the area of health care and applied sciences, however, Moser and Korstjens (2018) have not specified any particular figure. Instead, Moser and Korstjens (2018: 11) wrote "the usually small sample size in qualitative research depends on the information richness of the data, the variety of participants (or other units), the broadness of the research question and the phenomenon, the data collection method (e.g., individual or group interviews) and the type of sampling strategy". Conversely, Sauro (2015) in comparing the five major qualitative methods wrote ethnography focused on the context or culture, with no specific sample size, and the data collection is observation and interviews.

The Data Collection

The data collection is selected according to recommendations from ethnographers. According to Atkinson et al. (2001: 4), "observations and participation (according to circumstance and the analytic purpose at hand) remain the characteristic features of the ethnographic approach". In our study, we chose observations (Byrne, 2001; O'Reilly, 2009) and fieldnotes. Fieldnotes were observations written at the research site (Chiseri-Strater & Sunstein, 1997; Fetterman, 2010). Unstructured interviews and documents were collected to support our observations. Aide memoire's (Raktham, 2008) were collected to confirm our data. In Raktham's (2008) ethnographic study, she only depended on her basic tools such as interviews and fieldnotes or diaries which were observations and written descriptions of what was seen and heard.

Our data collection was done in an overt manner which meant everyone knew who the researchers were. In the beginning, observations were done in a structured manner using a checklist (or protocol) (Grbich, 2013). Eventually, the collected data were mostly unstructured (Hammersley & Atkinson, 2007). Data was collected from observations, fieldnotes, field interviews, documents, artifacts, audio, visual, and WhatsApp. This research employed an inductive reasoning process. The data collection was also kept in order, in a systematic manner as shown in Figure 2 as follows.

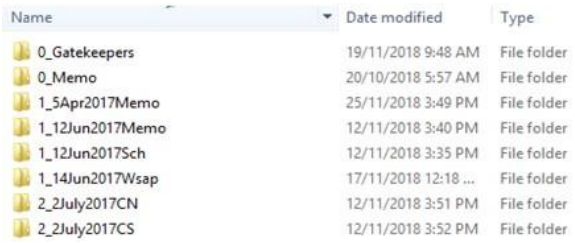

Figure 2: The Arrangement of Data Collection in Chronological Order

Source: Abdullah (2019)

The arrangement of data collection in chronological order is explained as follows: to locate the raw data in the folder 1_12Jun2017Sch. The labelling would be "(1_)" in the school ground (Sch). The reader could look for folder 1_ to locate all raw data obtained from the school.

Observations

Observations are the important element of this ethnographic study; fieldnote observations were part of ethnographic fieldwork (Byrne, 2001; O'Reilly, 2009). "Participant observation is the main method of ethnography and involves taking part as a member of a community while making mental and then written, theoretically informed observations." (O'Reilly, 2009: 150)

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Figure 3 illustrates the relationship between the observer and the setting in participant and nonparticipant observation. However, the level of immersion depended on the research question, the gatekeeper, and the Muslim culture. In this context, there was a separation between opposite gender. Nevertheless, Schmid (1992) argued that some level of participation was adequate. In this study, the level of immersion is a participant observer.

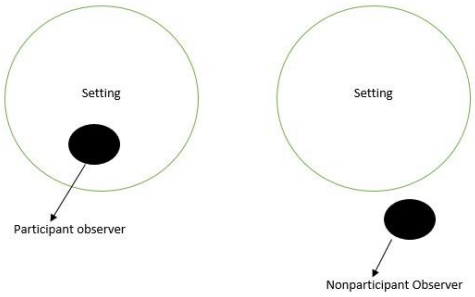


Figure 3: The Level of Immersion

Source: Vierra et al. (1998)

Fieldnotes

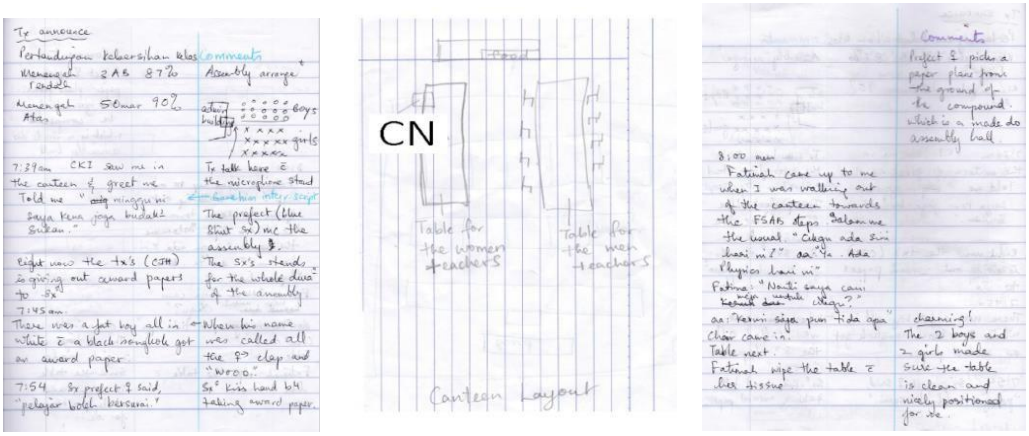
Fieldnotes are observations that were written at the research site, during interviews and from daily conversations with the informants, and throughout the data collection process (ChiseriStrater & Sunstein, 1997; Fetterman, 2010). Fieldnotes could be handwritten or audiotaped (Larson, 1995; Madden, 2017; Raktham, 2008). The type of fieldnotes in this study were both taken in the hurly-burly of active fieldwork and checked at the end of a day's work just to make sure no information were missed (Madden 2017). The fieldnotes were both handwritten and audiotaped.

For Chiseri-Strater and Sunstein (1997), the information that they listed as important for fieldnotes were date, time, and place of observation, specific facts, numbers, details, sensory impressions like sights, sounds, textures, smell, tastes; personal responses to the act of recording fieldnotes and how others watch; specific words, phrases, summaries of conversations, and insider language; questions about people or behaviours at the site. O'Reilly (2009) considered continuous references of fieldwork, fieldnotes, and theories to an ethnographer's descriptions, interpretations, explanations, and explanations as good notes.

We had to be selective with the fieldnotes text, so we noted down what we felt was significant as recommended by Emerson et al. (2001). Emerson et al. (2001) recommended bits and pieces of incidents, beginnings and ends of narratives, accounts of chance meetings, and rare occurrences, and details of a wide range of unconnected matters for example the classroom setting, the school architecture, and the dress codes.

The ethnographer progressed as in a spiral, moving back and forth continually from idea to theory to design to data collection to findings, analysis, reading and back to theory. We collected and analysed data at the same time (Fetterman, 2010). Spiral meant the progress of moving forward and backward, moving forward then having to go back to data or to the site, clarifying, then return to analysis, then writing and the process repeats itself until the product which was the report or dissertation was produced. This research was not a one-off event, it was an iterative process. We collected data, we read, we thought and reflected, we made notes, we collected data again, then we thought and reflected again, we made notes, and so on.

Emerson et al. (2011) were of the opinion that good ethnographers improved the quality of their fieldnotes by constantly reflecting on how to write their fieldnotes, a skill learnt and improved with time. They acknowledged that different ethnographers wrote differently depending on several factors. For some of us, there is a belief that fieldnotes was a product that could be influenced by some of us with positivist background, so we constantly kept a self-conscious attention so that we remained in the constructivism-interpretivism paradigm. The fieldnotes were also influenced by our theoretical interests, personality, and mood (Emerson et al., 2011). We overcame these influences through reflection, and reflexivity. In addition, we discussed among ourselves and other scholars.



(a) **(b)** **(c)**

Figure 4: (a) An Excerpt of the Fieldnotes; (b) Mapping Space; (c) Reflection in the Comments Column

Source: Abdullah (2019)

A drawing of the site called mapping space was also proposed by Chiseri-Strater and Sunstein (1997), which was also called layout shown in Figure 4 (b). This study's fieldnotes adopted the 'one notebook fits all' approach (Madden, 2010) as seen in Figure 4 (a). Therefore, we included everything we could see, smell and taste. This also meant the fieldnotes included reflection which we inserted in our comments section as in Figure 4 (c).

Techniques for Data Collection

The qualitative data collected in this study were in the form of text. According to Ryan and Bernard (2000), free lists, pile sorts, frame elicitations, and triad tests were techniques for data collection. In this study, free flowing text were the proxy for experiences.

Ryan and Bernard (2000) mentioned the technique of analysis for free-flowing texts could either be the use of raw text or a reduction of the text that was needed first. If raw text were analysed, then the methods key-words-in-context (KWIC), word counts, semantic network analysis, and cognitive maps could be employed. We used KWIC, as the nature of the research was to explore. The data could be revealed in a segmented text i.e. words with the basic meaningful components or the data could be large blocks of text where meanings were found (Ryan & Bernard, 2000). If the method required a reduction of text to codes, the possible methods of analysis (or coding traditions) would be grounded theory, schema analysis, classic content analysis, content dictionaries, analytical induction, and ethnographic decision models. However, we used Saldaña's (2011, 2013) guide because he had a comprehensive guide of data reduction.

In order to help researchers, discover themes in text, Ryan and Bernard (2000) suggested constant comparisons and memoing as some techniques of word analysis to use. In our decision making, although we did not do word counts but if a particular word reveals a majority, this would lead to our "saturation". In addition, to answer our research question, we looked at the social interactions within the Sociocultural Theory as elaborated in Abdullah (2019), in the form of relationships with teachers (teacher-student interaction), peer interaction, and other emerging interactions which were factors guiding the students' behaviour (Raktham, 2008), and the connection between the students' learning of science in school and the students' pathway of constructing scientific concepts relating to their sociocultural activities (Yuenyong & Yuenyong, 2012).

The Data Analysis

The first step was managing the plethora of data, the next was reducing data to codes, then the data display showing the different ways data were presented in this study, then drawing conclusion and verification leading to the writing up of the study. Moreover, the distinction between data collection and data analysis in participant observation was vague (Schmid, 1992). Schmid (1992: 28) argued that the characteristic of participant observation was its "constant interplay between data collection and data analysis".

The statement "No one, including myself, can claim final authority on coding's utility or the "best" way to analyse qualitative data" (Saldaña, 2013: 2) impelled Johnny Saldaña to highlight the diverse opinions among scholars in the field. He (Saldaña) admitted for the sake of clarity or flexibility, he adapted and renamed prescribed coding methods. Thus the subjectivity of the author or researcher in play. Creswell and Poth (2017) mentioned the possibility of Harry Wolcott's description, analysis, and interpretation of the culture-sharing group. Description is defined as "describe the culture-sharing group and setting" (Creswell & Poth, 2017: 204). Saldaña (2013) revealed that some scholars believe coding as the ultimate strategy, yet others believe the contrary. We selected both interpretations and Saldaña's coding as a way to gain better insight into our research.

Saldaña's (2011, 2013) coding manual was used as a guide in this study. Saldaña (2013: 35) recommended "shop talk" with a colleague or expert/mentor about the coding and analysis as a researcher progress through them. We can also do "member checking" (Saldaña 2013: 35) meaning we consult the informants themselves during analysis as a way of validating the findings. In this manner, we are able to make better connections between categories in progress (Saldaña, 2013). Saldaña (2013) suggested to also use other researchers (Cobern & Aikenhead, 1997; Saldaña, 2013; Shaunessy-Dedrick et al., 2015) coding.

Focusing on coding, Sipe and Ghiso (2004) labelled all coding as a judgment call. Saldaña (2013) agreed with Sipe and Ghiso that coding brought a researcher's subjectivities, personalities, inclinations, and coincidences to the coding process. As the analysis progressed, the coding scheme would not be the same as when it was in the beginning (Saldaña, 2013). In any case, the technique to decide a corpus of a text and then the units of analysis within that selected corpus of a text could be random or purposive (Ryan & Bernard, 2000).

Saldaña (2013) mentioned that one could develop new or hybrid coding schemes, or one could adapt the coding schemes of other researchers (e.g. Cobern et al. (1995) in Cobern & Aikenhead (1997); Saldaña, 2013; Shaunessy-Dedrick et al., 2015) to fit one's research. So, we assimilated

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and adapted for example some of Shaunessy-Dedrick et al. (2015) comprehensive and useful list of coding to have some form of idea of some usable codes that could be adapted to our research. Nevertheless, we felt comfortable and confident with our own coding (Saldaña, 2013) as having our own customized codes made it easy for us in terms of retrieval. When we saw our labelling, we immediately knew the origin of the folder that held the code with the label in question.

Finally, the process of our coding schemes was iterative to mean we developed a coding scheme, we applied the coding scheme to our data, re-read the data and compared the coding scheme to the data, re-evaluated if the categories and themes were appropriate, if we were not satisfied we re-do the process again. We also brought our categories and themes to our debriefs to get a second opinion (Randolph, 2009).

Conclusively, data reduction was "the process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in written-up fieldnotes or transcriptions…the data reduction/transforming process continues after fieldwork, until a final report is completed" (Miles & Huberman, 1994: 10). For this study, the analytical process consisted of first cycle coding methods (Elemental Methods) and second cycle coding methods (Themeing the data) (Abdullah, 2020). The patterns detected from categories would allow us to find the theme (Saldaña, 2011).

The research question determines the type of knowledge that we intend to generate. We align the coding method(s) to our research question which could also be just one coding method. This is because selecting the appropriate coding method(s) depend(s) on the nature and goals of our study; hence no researcher can claim that one coding method is better than the other because each qualitative study is unique (Saldaña, 2013).

The research question "What is the nature of science classroom practices in an Islamic Religious Secondary School science classroom?" is an ontological question addressing the nature of informants' realities, so the aligned research questions might begin with: "What is the nature of…?" (Saldaña, 2013: 61). This is consistent with studies by Mariya (2012) on the nature of classroom practices that shape learning. In order to describe the nature of the classroom, Raktham (2008) proposed the classroom activities, the teaching methods used, rules, schedules, classroom etiquette, and the ways that our informants interacted. Emerson et al. (2001) suggested observing for example the classroom setting, the school architecture, and the dress codes. Classroom observation should include the physical characteristics of the classroom, and teacher-student and student-student patterns of behaviour; hence the social aspects of the classroom is also studied (Mariya, 2012; Raktham, 2008). Similarly, WatsonGegeo (1997: 136) recommended important information such as a description of the classroom setting; a statement of the principles underlying classroom social organization; and an account of the social norms guiding participants' behaviour and shaping their interpretations of specific interactions should be included in the finished report. In Vivo coding plus Themeing the data were selected to reveal the personal, interpretive meanings found within the data (Saldaña, 2013). Byrne (2001) postulated the dimensions that should be documented were the physical layout being investigated and the objects in the environment. We should observe the people and their activities and actions, and the timing of the events (Byrne, 2001).

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Research Findings

We approached this study with a (an) constructivist/interpretivist lens. We collected data by writing in the fieldnotes, and the transcribed interviews. The WhatsApp technology, audio and visual data were either used to confirm other data or as an aide memoire. We also had to go through several levels of gatekeepers such as JHEAINS (Jabatan Hal Ehwal Agama Islam Negeri Sabah or Sabah Department of Islamic Affairs), the principal, the assistant principal, and the science teachers before we could truly get entrance into the informants' natural setting which was the science classroom. The narrative account of our ethnographic study and the analysis of the events and activities were based on the researcher's own interpretation (Raktham, 2008).

The Context The Agency JHEAINS and Other Gatekeepers

The Agency JHEAINS was the first gatekeeper. It is a department under the Sabah Religious Department which is under the Sabah Chief Minister's Department. The role of JHEAINS according to the National Audit Department (2015) was to maintain mosques, surau (a place of prayer smaller than a mosque) and religious schools, as well as to prepare and ensure the good conditions of religious schools in the primary and secondary level. As of 2015, the responsibility of JHEAINS was to oversee 1,012 mosques, 973 surau, 103 State Religious Schools (SAN) and 6 State Religious Secondary Schools (SMAN). SMAN-1 is one of the 6 State Religious Secondary Schools.

The current exact location of the school is in the Kinarut Township, in the District of Papar, Sabah. SMAN-1 is one of the oldest SMAN School in Sabah. SMAN-1 was founded in 1975 and at that time located in Sembulan 4.3 kilometres from the capital Kota Kinabalu. It only moved to Kinarut, 17 kilometres from Kota Kinabalu in 2011 (Figure 5). The essential information about SMAN-1 could be found in Wikipedia. The assistant principle, CJH confirmed through our WhatsApp dated 11th July 2017 that the Wikipedia information was and still is correct. SMAN-1 offered pure science secondary classes since 2007. Even after it moved to Kinarut in 2012, SMAN-1 continued to offer the pure science secondary classes. The informants in SMAN-1 communicated with each other in Bahasa Malaysia (Malay).

Figure 5: A Google Map of the School

Source: Abdullah (2019)

The Informants

An informant is a person who shares information about the meanings of his or her culture with a researcher (Chiseri-Strater & Sunstein, 1997). The informants were two groups of students from the form five science classroom of SMAN-1 State Islamic Religious Secondary School, their three science teachers, and the assistant principal CJH. There are three form five streamed classrooms, one pure science stream and two arts streams. The science stream classroom is called form 5 Abu Bakar As-Siddiq. For the year 2017, the form 5 Abu Bakar As-Siddiq science

classroom consisted of sixteen students with seven boys and nine girls. For the year 2018, the form 5 Abu Bakar As-Siddiq science classroom consisted of twenty-three students with twelve boys and eleven girls. Therefore, for the year 2017 and 2018, there were three form 5 classes namely form 5 Abu Bakar As-Siddiq (Pure Science Stream), form 5 Umar Al-Khatab (Arts stream), and form 5 Uthman Al-Affan (Arts-economics stream). These classes were named after well-known Muslim scholars. The form 5 students were mostly 17 years of age. The science teachers namely: CS was the physics teacher and their class teacher; CKI was the discipline teacher as well as the subject teacher for additional mathematics and biology; CN was the chemistry teacher. These teachers taught the form fours and form fives. However, CJH was of importance in this study because she was the assistant principal as well as the history teacher.

Learning of science was offered at least a session of one hour a day to sixteen students in 2017, and at least a session of one hour every day except Wednesday to twenty-three students in 2018. All the students in form 5 Abu Bakar As-Siddiq science class were Muslim dependents thus they practised the same religion. Their ethnicity and origin were recorded and presented in Table 1 as follows.

Table 1: (a) List of 2017 Student Names, Ethnicity and Origin; (b) List of 2018 Student Names, Ethnicity and Origin (a)

(b)

Students	Ethnicity	Origin
Boys		
SA	Dusun	Ranau, Sabah
SF	Brunei	Bongawan, Brunei
SM	Bajau	Lahad Datu, Sabah
SSy	Melayu	Kelantan, Peninsula Malaysia
SFi	Bajau	Kota Belud, Sabah
SFq	Melayu	Kedah, Peninsula Malaysia
Girls		
SxA	Bisaya	Beaufort, Sabah
SxU	Bajau	Beaufort, Sabah
SxI	Bisaya	Beaufort, Sabah
SxHi	Bajau	Putatan, Sabah
SxN	Melayu	Sandakan, Sabah
SxIm	Brunei	Sandakan, Sabah
SxHk	Brunei	Menggatal, Sabah
SxS	Dusun	Ranau, Sabah
SxZ	Melayu	Pulau Pinang, Peninsula Malaysia

Students	Ethnicity	Origin
Boys		
SD	Dusun	Ranau, Sabah
SAM	Dusun	Tamparuli, Sabah
SSR	Bajau	Kinarut, Sabah
SZJ	Dusun	Ranau, Sabah
SAF	Melayu	Kedah, Peninsula Malaysia
SAI	Bajau	Kinarut, Sabah
SAA	Melayu	Tawau, Sabah
SIJ	Dusun	Ranau, Sabah
SIB	Bajau	Kota Belud, Sabah
SRD	Bugis	Tawau, Sabah
STS	Iranun	Kota Belud, Sabah
SNH	Brunei	Papar, Sabah
Girls		
SxAJ	Melayu	Inanam, Sabah
SxDN	Brunei	Papar, Sabah
SxFA	Bugis	Lahad Datu, Sabah
SxHH	Bugis	Kuala Penyu, Sabah
SxIF	Iranun	Kota Belud, Sabah
SxNR	Banjar	Ranau, Sabah
SxNF	Bajau	Papar, Sabah
SxNS	Melayu	Kuala Lumpur, Peninsula Malaysia
SxNZ	Melayu	Kedah, Peninsula Malaysia
SxSN	Brunei	Papar, Sabah
SxSZ	Melayu	Kelantan, Peninsula Malaysia

Source: (a) Fieldnotes, Wednesday, 12 July 2017 (Abdullah, 2019); (b) Fieldnotes, Friday, 29 June 2018 (Abdullah, 2019)

The Duration of the Classroom Ethnography

The duration of this study was from February 2017 to July 2018 involving two form five science classrooms in SMAN-1 State Islamic Religious Secondary School. As illustrated in Table 2, participant observations of only science subjects taught namely, physics, biology, and chemistry for one hour or one and a half hours with one session of two hours biology laboratory session were conducted. Based on 18 months of fieldwork, 9 months were of CE through classroom observation with 21 hours and 30 minutes of science classroom observations (twenty days of science subject classroom observations and one day of additional mathematics classroom observation). The preparation for the field (4 months: 6th February 2017 to 11th June 2017) meaning the preliminary visit was very important to build the rapport between the

researcher, the gatekeepers and the informants involved. Consistent with O'Reilly (2009: 5), "Ethnographic research properly begins once one has entered the field…involves gaining access". In November 2017, the group of students for the year 2017 sat for their SPM 2017 government examinations (SPM, Sijil Pelajaran Malaysia or Malaysian Certificate of Education, equivalent to the IGSCE or O level). The researcher-maintained contact with the year 2017 informants to help fill gaps of data collection and data analysis.

Table 2: Intervals of the Research

Duration (Months)	Dates	Details
4	6 Feb 2017 - 11 June 2017	Gatekeepers & Research
6	11 June 2017 - 30 Nov 2017	School, data collection & analysis Maintain contact to fill gaps
5	1 December 2017 - 16 April 2018	School, data collection & analysis
3	17 April 2018 - 20 July 2018	
18		

Source: Abdullah (2019)

Research Question: What is the Nature of Science Classroom Practices in an Islamic Religious Secondary School Science Classroom?

Researchers' suggestions on what to focus on were the description of classroom setting (Emerson et al, 2001; Watson-Gegeo, 1997); classroom activities (Raktham, 2008); school architecture (Emerson et al, 2001); the teaching methods used, rules, schedules, classroom etiquette, and the ways that the informants interacted (Raktham, 2008); the dress code (Emerson et al., 2001).

The students preferred a teacher-centred desk and chair arrangement. CS allowed his students to decorate their classroom ad libitum. Even when other teachers grumbled about the choice of the 2018 students' decoration, the students were free to express themselves. An excerpt of an interview is as follows:

(09:01) Amnah: lepas tu susunan meja mengikut mereka baru diarang tukar diarang bilang (Translated: The students said they were the ones who arrange the tables.)
(09:03) CS: ya, ikut diarang sya bagi dia urus kan lah (Translated: Yes, it's up to them to decide.)
Amnah: ada ada betul kah ada ruggutan daripada cikgu cikgu lain macam susah mau jalan
(Translated: Is it true that the other teachers complained about the walking space?)
(09:09) CS: ya susah mau jalan (both laughing) (Translated: Yes, tough to walk.)
(09:12) Amnah: tapi diarang ok lah diarang sungguh senang hati bila dibagi kesempatan membuat apa yang diarang suka (Translated: But they seemed ok that they were given the opportunity to do something they liked.)
(09:17) CS: ya ya apa yang diarang suka (Translated: Yes, yes, they like that.) iv.CS.83.IT.005.
(09:01) The classroom layout is shown in Figure 6 (a) and 6 (b).

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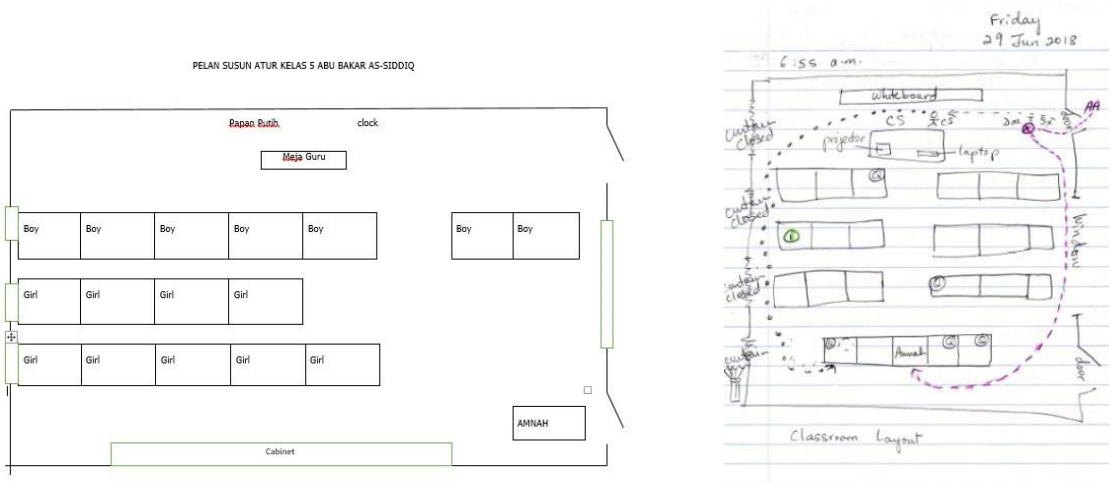

(a) **(b)**

Figure 6: (a) Classroom Layout for the Year 2017 (dc.3.p.(8:00am)) (b) Classroom Layout for the Year 2018 (Field notes 29 June 2018)

Source: Abdullah (2019)

The findings were about the classroom setting, and according to Raktham (2008) the classroom activities, the teaching methods used, rules, schedules, classroom etiquette, and the ways that the informants interacted. The classroom layout, school attire, schedule, teachers and students' movement in the classroom, language and scientific terms, teaching and learning materials were taken into account. In the second cycle process of coding, or Pattern coding, eight categories emerged relating to the research question. These categories were: Muslim dress code, Girls excluded, Language, Teacher centred desk and chair arrangement, Schedule, Textbook learning, Study materials disconnect from SPM new format, Technology (laptop/projector). Details of the coding processes are shared in several series on Youtube (Abdullah, 2020).

Discussion

Culture, as a general concept encompasses language, beliefs, social norms, rules of behaviour, roles of men and women, architecture, values, dress codes, status, discipline and punishment, relationships, and many more. CE helps the audience have this cultural awareness.

The social norm interpreted in this context is the dress code. The category Muslim Dress Code is generated. The embedded social structures are the Muslim Dress Code in a Muslim community and girls' exclusion in certain activities. In this context, it is a respectful approach to exclude girls as a sign of respect in their status as a woman. In addition, the seating position of the students were such that the boys were in front and the girls sat at the back. Contrary to Atkinson et al. (2001) proposal that girls excluded as a class position thus girls locked within femininity and domesticity, whereas boys locked into working-class jobs. However, from the perspective of this Muslim school community this cultural knowledge (Shutz & Luckmann, 1973) upholds these interactions as Islamic values (Embong, 2011; Hashim, 2014; Hashim & Ssekamanya, 2013). The home is also a source of cultural knowledge; hence students will find it natural to re-apply these cultural knowledges in the classroom (Tobin, 2004). However, Tobin (2004: 192) believed "when students come to the classroom, they bring their cultural knowledge with them and it can constrain the way they interact with others and engage the activities designed to promote learning". In the learning of science, hands on experience are important to gain familiarity with any tools or equipment. In this context, the categories Girls

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Exclude interprets that the girls were excluded from helping the teacher with setting up the classroom technology like the laptop and projector. These findings confirmed similar findings from other non-Western cultures which indicated that religious traditions and beliefs in a given society can influence negatively (from the perspective of a Western scientific community) on learners' responses to the teaching of science (Jegede & Okebukola, 1989).

The generated categories Language, Teacher Centred Desk And Chair Arrangement, Textbook Learning, and Technology (laptop/projector). The category Language interprets students having trouble remembering the plethora of scientific terms. This is consistent with previous studies (Baker, 1998; Halim & Meerah, 2016). The lack of language use could hinder science learning. Halim and Meerah (2016) said that the language of scientific and technological knowledge was English; however, they revealed that the level of English for Malaysian students was low. Moreover, the students came from various ethnic groups as seen in Table 1(a) and Table 1(b) indicating the various possible ethnic languages they grew up with thus language as a cultural knowledge. In this classroom, students communicated in Malay. The medium of instruction was also in Malay. Although once in a while teachers do "sprinkle" bits of English sentences in their conversation to fulfil promoting or encouraging English to their students. Science terms and language is a challenge particularly to recall or further understand advanced concept learning in science.

For both students from class of the year 2017 and 2018, their preference of desks and chairs arrangements were the lecture room arrangement. The students were facing the table of the teacher who sat in the front of the classroom as shown in Figure 6(a) and Figure 6(b). This teacher centred arrangement was similar to Mariya's (2012) findings. Students were passive learners and depended on the teacher for notes. Often discussions during pause time were led by the teachers. Similar findings of passive learning were seen in other researches (Mariya, 2012; Raktham, 2008) from non-Western background. All the science teachers taught with textbooks and handouts of past years SPM questions. SPM is equivalent to the British 'O' Level, hence a very crucial examination for all 17-year olds. CS (form 5 physics teacher and class teacher) supported his teaching with technology (a laptop and a projector) but his PowerPoint was a replicate of his textbook or selected SPM questions. CKI (form 5 biology teacher) would support his teaching with technology too but not as often as CS. So, the teachers used the textbooks for their teaching. The teachers did most of the talking while the students listened quietly. We interpreted this quiet behaviour as respect to the elders (teacher) very much similar to Waldrip's and Taylor's (1999) findings. When the teacher gives SPM exercises, the teacher expects the students to participate in answering the exercises according to the teacher's expected answers. These findings were supported by Mariya (2012) who found similar teacher centred, and passive learning.

The category Study Materials Disconnect From SPM New Format revealed the science teachers believed it unfair that students had to study materials that did not relate to their final national examinations (SPM). The period 2017 was the second year of the Malaysian education reform on the new format of SPM science examination questions for students from the science stream, and the implementation continued to the period of 2018. The new format of SPM questions originally started in 2016 (Memo 4 Nov 2018). This category is interpreted as an inequity of the study materials provided and the reality of the actual national examination.

For the category Schedule: the students' schedule was done by the school administration which included their daily prayers and other religious activities such as Ramadhan. The bell ring denotes the beginning and ending of each lesson. The azan (call for prayers) denotes the time

for the informants daily five times prayers. Before the researcher started the research, the students' schedule was incorporated with both religious and secular syllabi. This meant that the students had to study a total of 25 subjects in one school year, whereas normal secular schools only had 10 to 11 subjects. The interpretation is that the students had a very heavy study load. The SMAN-1's schedule includes not only the SPM but also STAM examination (Sijil Tinggi Agama Malaysia; a Malaysian Higher Religious Education Certificate for the 18-19 year's students). Since 2007, the first time SMAN-1 offered science stream classes, SMAN-1 could not satisfactorily improve its science students' achievement until recently in 2017. We interpreted the awarding of SMAN-1's best average secondary school grade awards for SPM (2017) to the principal's initiative to shorten STAM to one year allowing form five students to focus on their SPM examinations. The principal created an alternating schedule so that students could focus on studying the targeted examinations. For instance, for the informants of the year 2017 who had to sit for their form five SPM examinations, all subjects relating to religious studies were reduced except the daily reciting of the Al Qur'an in Arabic language. We interpreted the act of not eliminating the daily reciting of the Al Qur'an as utmost respect to the reciting of the Holy Book. Once SPM was over, the said students would continue studying their religious syllabus for the year 2018 and thus sit for their STAM examinations that very year 2018. This is consistent with studies by Malaysian researchers (Embong, 2011; Hashim, 2014; Hashim & Ssekamanya, 2013) thus the Muslim community consistently seeking integration of Islamic values and beliefs in their children education. The cultural knowledge is also intertwined in this study. As cultural knowledge is authority, language and potential career (Cobern & Aikenhead, 1997), and the informants will seek apprenticeship in a Muslim scientific community with similar language learnt; hence the informants will seek to be enculturated into the Muslim scientific community (Brown et al., 1989) interpreted as seeking to study in an Islamic country or an Islamic establishment. This alternating system is new, and it seems to be efficient in increasing the students' overall performance. Currently, SMAN-1 is still the only school whose STAM has been shortened to a year instead of two. The schedule of SMAN-1 is incorporated in both religious and academic activities as hoped by many Muslim scholars (Embong, 2011; Hashim, 2014; Hashim & Ssekamanya, 2013) and Muslim parents but there is a lack of research pondering on the timing and the load subjects on the students.

The concept map is presented in Figure 7. Detailed explanations in several series of the coding processes leading to the theme could be found on Youtube (Abdullah, 2020).

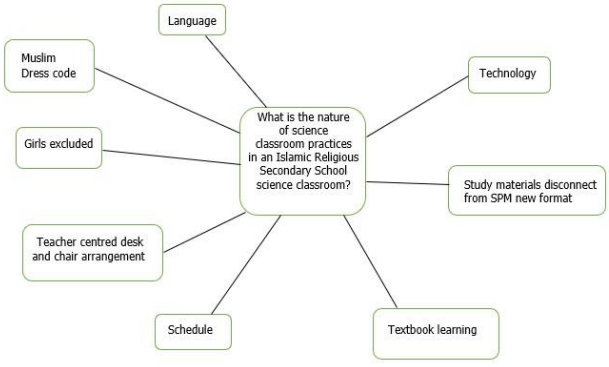

Figure 7: Concept Map for Research Question

Source: Abdullah (2019)

In this context, the research questions the nature of science classroom practices in SMAN-1 Islamic Religious Secondary School science classroom was answered as being intertwined with its social norms and cultural knowledge.

The social interactions were in the form of relationships with teachers (teacher-student interaction), peer interaction, and other emerging interactions which were factors guiding the students' behaviour within the Sociocultural Theory (Abdullah, 2019). There is a connection between the students' learning of science in school and the students' pathway of constructing scientific concepts relating to their sociocultural activities (Yuenyong & Yuenyong, 2012). Although, Driver et al. (1994) suggested social constructivism because for them (Driver et al., 1994; Sjøberg, 2008) learning science evolved from a personal constructivism perspective which was the Piagetian perspective (Sjøberg, 2008), to a social constructivism perspective which was the Vygotskian perspective (Sjøberg, 2008). Eventually, the social interactions Driver et al. (1994) were referring to be an apprenticeship. The findings in this study revealed an apprenticeship into the Muslim community whose participants acquired Western scientific knowledge. The social interactions between the teacher and student is within the Sociocultural Theory. Learning could be influenced at two levels in the Sociocultural Theory. The first level was the interaction with people around the learner in a society or a culture termed the sociocultural views on learning. The second level was the interaction between the learner and his/her concepts. In Cobern's and Aikenhead's (1997) perspective, learning science evolved from a personal constructivism perspective to a social constructivism perspective which meant that an individual's knowledge evolved from the individual towards the knowledge of the community. The specific supports in the form of materials were the textbook, teachers teaching with technology, and a focus on SPM materials.

The basic infrastructure standards for Sabah should have been fulfilled by the year 2015 (MOE, 2013). The interpretation is that students were unable to be enculturated into the scientific community because there is a lack of authentic activity and the practitioners basic tools (Brown et al., 1989) needed to be a science apprentice. The teachers resorted to textbook learning consistent with other researches (Mariya, 2012; Raktham 2008).

The Malaysian science education was originally a product of Western science (Halim & Meerah, 2016). However best the science education has been customised to Malaysian setting, the theme INEQUITIES derived from the categories (Figure 7) interpreted the Islamic religious school environment (i.e. the Muslim community) presenting social structures that are not similar to an apprenticeship into the Western scientific community.

CE provided insight into the nature of the science classroom practices interpreted as not portraying the Western science classroom but rather the discovery of a "hidden curriculum" (Larson, 1995). These findings are interpreted as the informants not enculturated in the Western scientific community but a Muslim scientific community. In fact, few researches have looked into or have tried to understand in-depth the constructive side of a Muslim scientific community. There is a gap in scientific apprenticeship interpreted as a gap between the transition of science knowledge from the classroom to the real world because students maintain the value that teachers are the providers of solutions to questions (Packer & Maddox, 2016) and the influence of the cultural knowledge potential career.

CE answered the research question interpreting the nature of the science classroom practices as a teacher-centred learning experience as can be observed from the desk and chair arrangement. The findings revealed that it was the students' preferences. These students' preferences are in

contrast with the MOE's (2013) calling for a student-centred learning. Much as the blueprint (MOE, 2013) states the implementation of technology in schools, this CE study reveals that the technology available is the basic laptop and projector, but no internet and so further teaching is only limited to a reproduction of the textbook. These findings could be further interpreted that technology could only benefit schools in the capital. Moreover, there is no relation to what the students learn in their specific support materials with the type of questions that the national examinations set. The teachers' belief that not all activities are appropriate for girls was interpreted as reduced participation by the girls' and perhaps girls also held back participation in other activities.

Adapting CE yielded the theme inequities interpreted as few in-depth researches are done as well as the influence of culture is not well understood. The findings of this study lead to the choice by the students themselves of the Teacher Centred Desk And Chair Arrangement as the informants struggle with Language, Schedule, Textbook Learning, Study Materials Disconnect From SPM New Format, and Technology. Students upheld respect elders which is one of the elements of cultural knowledge (Tan, 2011).

Conclusion

This study clearly shows that CE is important in studying educational beliefs of societies (Beach et al., 2018), hence providing deeper understanding of human experiences, phenomena and context as it addresses the "how" and "what" of research questions which is unreachable with quantitative research (Cleland, 2017). CE is important in addressing not only the study of the informants' behaviour, their activities, their interactions, and their discourse in formal educational settings, but CE also integrates the informants' perspectives on their own behaviour (Watson-Gegeo, 1997). In fact, it integrates why the informants do what they do. Classrooms and interactions are situated in various levels of context in which CE would be the most appropriate to provide a holistic analysis because the sociocultural nature of teaching and learning processes are greatly emphasized in CE (Watson-Gegeo, 1997).

The contribution of this paper is that academic trends could be best understood through CE as it provides insight into in-depth analysis of the informants' beliefs, values, and experiences (Baker & Taylor, 1995; Cobern & Aikenhead, 1997; Kian & Beach, 2019; Mariya, 2012; Raktham, 2008). When CE is conducted in the classroom context, it is often related to the Ministry of Education's implementation, success or failure, of a programme. The value of CE is that it gives the informants the right to be heard. CE contributions to the body of knowledge is in its commitment to its local and situated cultures' interpretation (Atkinson et al., 2001) as it study's a particular culture-sharing group (Creswell, 2015); hence CE's possibility to be adapted in each local setting and yielding research findings. In addition, coding manually could also produce relevant findings in answering the research objective (Abdullah, 2019).

The study has important implications for research given the well-known widespread discourses of CE (Bloome & Beauchemin, 2018; Erickson, 2010; Hammersley, 1990; Schmid, 1992; Watson-Gegeo, 1997; Zaharlick, 1992). This study could not only inform the gatekeepers but also add tangible insight and an alternative way of thinking for policy makers, practitioners, theory, and subsequent research. In order to have a successful policy, policy makers need to interact across cultural boundaries. It is possible that miscommunication could also occur in the same culture. The target audience, for example the students and teachers (the end user), need to be understood before policy makers could promote their product (for example a new brand of science education) to succeed. It is timely that local researchers embrace CE as it captures data and explains not only the "how" and "what" but also the "why" of data, rendering

CE cost-effective and result oriented in guiding policy makers. This study is based on adapting CE to local and situated cultures on first-hand exploration of a culture sharing group (Abdullah, 2019; Atkinson et al., 2001). It is welcomed as a global contribution to ethnographic study as studies are done by various authors internationally in different countries and also cross-disciplinary (Atkinson et al., 2001). However, this study is not intended to generalize to a population or other traditional schools as this study is not of causal relationship. The research methodology was interpretive and designed to provide an in-depth understanding of the context. From the aspect of rigor, transferability is possible with other SMAN Islamic religious schools of similar settings (Abdullah et al., 2019).

Some suggestions of future researches to widen the viewpoint of this study would be: to conduct studies on the "hidden curriculum", hence exploring the meanings of behaviours in the classroom context and analysing their impact on the teaching and learning process (Bloome & Beauchemin, 2018; Cooper, 1981); to conduct studies of classroom education (Bloome & Beauchemin, 2018) by repeating the study on various local classroom settings, and various levels of context; to compare the use of Saldaňa's coding process manually with the use of qualitative data analysis software (CAQDAS) program; to conduct research comparing the different research paradigms (critical theory, postpositivism) with this study's constructivism/interpretivism as these paradigms bound and guide the research; to conduct studies of cross-cultural interaction and classroom-community relations (Bloome & Beauchemin, 2018). More research should also look into outcomes if it was a single gendered classroom and the cultural sensitivity of the larger community.

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