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Multimodality in medical education: Perspectives on medical shadowing from an experiential learning curriculum

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Abstract

When undergraduate students join a premedical programme, they enrol in basic sciences with the rare opportunity to engage in clinical activities. One way to overcome this is a medical shadowing programme aimed at introducing students to important aspects in building their professional identity as future doctors: emotional intelligence and empathy, professionalism, teamwork, and leadership in medicine. As medical shadowing involves students' constant engagement with various material artefacts in a clinical setting, it makes sense to apply methods that include artefacts, such as multimodal and visual semiotics. Using an inquiry graphics analytical framework inspired by Peircean semiotics, this paper argues for the integration of multimodality in undergraduate medical experiential learning, a scarcely researched area in medical education. Using a case study methodology, this study reports on an analysis of students' visual representations of the intended learning goals and the applicability of visual artefacts as a tool for reflection on their shadowing experience. This research fills a gap in the literature on the role of multimodality, particularly visual imagery, in fostering new ideas that promote professional identity in medicine. Using data collected from 15 premedical students' written reflections on their shadowing experience, the study results show students' heightened awareness of physician attributes and their role in socializing premedical students early in their medical profession. The research findings would benefit premedical education

leaders, instructional designers, and curriculum developers and inspire medical educators to embrace multimodality in teaching, learning, and assessment.

1. Introduction

A common indispensable practice in medical schools is clinical training for students under the supervision of licensed physicians. However, premedical students enrolled in six-year medical programmes are immersed in basic sciences with the rare opportunity to shadow physicians early in their education to begin their process of socialization to the field of medicine.

This lack of experiential education sometimes leads to students feeling demotivated and disengaged from the learning process. However, an experiential learning (EL) curriculum can overcome this challenge through the provision of learning opportunities, such as mentoring programmes, physician shadowing activities, and doctor-patient observations in healthcare facilities. This study reports on premedical students' experiences in a medical shadowing programme aimed at introducing students to four important aspects in building their professional identity as future doctors: emotional intelligence and empathy, professionalism, teamwork, and leadership in medicine. Using an inquiry graphics (IG) approach (Lacković, 2018), this paper argues for the importance of incorporating a doctor/mentor-student/mentee shadowing programme in undergraduate medical education to expose premedical students at an early stage to the community of medical practice.

Based on an IG methodology, this study collects qualitative data from a group of premedical students participating in an EL programme. The results of this study would benefit premedical education leaders, instructional designers, and curriculum developers and inspire medical educators to adopt an innovative EL programme and integrate multimodality in teaching, learning, and assessment. The following sections will critically appraise the available literature, describe the methodology and the method used to collect data, and discuss the data analysis in the light of the adopted theoretical framework.

2. Medical shadowing, experiential learning, and multimodality in medical education

This section critically analyses the available literature pertaining to the topic under investigation and focuses on three main areas: medical shadowing as EL, student

experience with EL, and multimodality in medical education. Google Scholar was used to search the literature as its scope allows a wider coverage of resources than a specific database. Keywords and search terms included: "medical education"; "experiential learning"; multimodality; "graphic inquiry"; "premedical student"; "student experience". Results varied between 9000 to 1 result based on the combination of keywords, Boolean operators, and filters added. However, most of the results were broad in their scope, which required the researcher to only keep highly relevant resources as the study required a focused approach that would allow a clear understanding of the investigated topic.

2.1 Medical shadowing as experiential learning

In medical education, EL has served many purposes, such as developing students' health literacy skills, expanding their knowledge through observation, and improving their communication skills. According to Brookfield (1983), EL can be used in two different ways: the first one is setting up training programmes that are sponsored by an institution, while the second one is "education that occurs as a direct participation in the events of life" (Houle, 1980, p. 221). In this study, we refer to EL as a training programme that was set up to provide students with the "chance to acquire and apply knowledge, skills and feelings in an immediate and relevant setting" (Smith, 2010). Hence, using EL theory frames this medical shadowing programme as a pedagogical practice that contributes to learners' increased motivation and engagement.

Shadowing is a form of EL related to knowledge production methods used in internships, community service learning, and adult learning theory. In the late 1960s, Carl Rogers founded the EL theory based on the social learning theory in which the learners are keen to be involved in an activity that stimulates their cognitive and affective perspectives, thereby influencing their experience and meaning making (Hedin, 2010). Later, Kolb developed the EL theory by examining the four stages of the learning process: concrete experience, observation and reflection, abstract conceptualisation, and active experimentation (Dunn, 2002). These stages are usually "represented as a circular movement" or "as a spiral" (Smith, 2010). However, Kolb's model was criticised for different reasons. For instance, it cannot be applied to other learning situations that involve memorisation (Jarvis, 1994); it fails to give sufficient attention to the reflection process (Boud et al., 1985); it does not take into consideration the cultural context (Anderson, 1988); and most of all, the idea of moving from one stage to the other "is too simplistic" and does not correspond to reality since a number of processes can happen at once and some stages can be jumped. More-

over, Menaker, et al. (2006) described EL as an activity for learners to reflect on their experience and make decisions based on the results of their reflection and first-hand experience.

EL has been incorporated in medical education for many years and serves many purposes. Some of these purposes have been discussed in the literature, and can be summarized as follows (Goldstein et al., 2014; Koponen et al., 2012; Stepien & Baernstein, 2006):

- develop students' health literacy skills by experiencing medical conditions in a real-life setting;
- expand students' knowledge by observing and inquiring about health issues and conditions;
- improve their communication skills by engaging in discussions and sharing knowledge;
- develop an understanding of doctor-patient relationships by establishing clear communication paths and expressing empathy towards society;
- participate in community service to develop a sense of belonging and a compassionate approach to medicine and the art of healing.

Therefore, it is important to provide premedical students with the opportunity to recognize the weight of the commitment to being a medical student and later a physician. Through shadowing, students can observe the physicians' roles, their interactions with patients, communication with other healthcare providers, and the level of decision-making (Wang et al., 2015). Although students have already committed themselves to the study of medicine, shadowing might also influence their decision in pursuing a particular specialty (Kitsis, 2011). This decision-making process can be regarded as a precursor to premedical students' professional identity formation.

2.2 Student experience with experiential learning

Developing a professional identity necessitates an immersion in an authentic medical environment early in students' undergraduate education, such as during their premedical years. Hence, it is critical to afford premedical students opportunities in the curriculum to engage in the profession through medical role modelling, mentoring, and shadowing. This 'enculturation', as described by Goldstein et al. (2014), occurs through students shadowing physicians and reflecting on their experiences in the clinical field.

The formation of medical professional identity consists of three core integrated areas: professionalism, psychosocial identity development, and formation (Holden et al., 2012). However, professional identity necessitates first an understanding of professionalism, which Goldstein et al. (2014) argue is essential in medicine. According to the Charter on Medical Professionalism, professionalism is expected from healthcare providers in order to "promote justice in the health care system, including the fair distribution of health care resources. Physicians should work actively to eliminate discrimination in health care, whether based on race, gender, socioeconomic status, ethnicity, religion, or any other social category" (ABIM Foundation, 2002, p. 244). Therefore, to develop professional identity, exposure to role models should start as early as possible "before, and not after, students enter medical school" (Goldstein et al., 2014, p. 498). Thus, establishing a shadowing programme can play a critical role in the development of premedical students' professional identity at the outset of their premedical education.

In addition to forming a professional identity, a shadowing experience exposes students to significant leadership attributes requisite for an effective performance in healthcare organizations. A solid academic background and technical abilities are insufficient for optimal performance; consequently, medical students need to grow their leadership skills early (Warren & Carnall, 2011), and these skills should be embedded into the curriculum. For instance, when the Academy of Medical Royal Colleges (2010) and the NHS Institute for Innovation and Improvement established the Medical Leadership Competency Framework, they clearly emphasized incorporating medical leadership skills into undergraduate and postgraduate programmes. Other attributes that go hand in hand with leadership are teamwork and collaboration. In a study by Block et al. (2018), premedical students who participated in a shadowing programme recognized the complexity of the healthcare system, especially the importance of teamwork and collaboration among healthcare teams, as the most important approach to patient care.

2.3 Multimodality in medical education

Nevertheless, despite the obvious competencies medical students acquire, few premedical students benefit from clinical experience and need to wait until they progress beyond the basic sciences curricula. To fill this gap, undergraduate students resort to multiple alternative modalities, such as popular media shows on television or the web, but this exposure does not reflect a real image of patient interactions, the challenges physicians encounter, and the responsibilities they assume on a daily basis (Wang et al., 2015). While

multimodality learning is helpful in engaging 21st century learners (Jewitt, 2005), medical education needs to embrace these multimodalities for an optimal real-world learning experience.

By incorporating multimodal methods, EL can afford learners an opportunity to derive rich meaning from their shadowing experience. This rich blend can help students understand the requirements of a specific professional domain and facilitate their career decision-making (Baker-Loges & Duckworth, 1991).

Multimodality is indeed a student-centred approach in which students are actively involved in selecting and using the most relevant resources for their learning needs (Mayer, 2001). Multimodality integrates different visual, textual, and verbal representations for an enhanced learning experience and “provide[s] different types of resources to the student for stimulating learning in meaningful ways within and across disciplines” (Papageorgiou & Lamas, 2017, p. 133). In addition, multimodality includes an array of representations from oral and written language, visual, gestural, tactile and spatial (Cope & Kalantzis, 2009), which in turn affects the learning approach positively.

In a recent effort aimed at integrating visual art into medicine, medical students are trained in narrative medicine not only through readings but also through the use of images and visual artefacts that develop students’ cognitive and emotional aptitudes (Helle, 2011). However, more methodological attention is given to literary texts than visual or graphic analysis of imagery forms of expression in premedical education. Therefore, to investigate the role of a multimodal teaching and learning approach in medical shadowing, students’ reflections on their shadowing experience through the use of images or drawings were collected.

2.4 Research gap

This paper fills this lacuna in the literature on the student experience, particularly in the area of the premedical student shadowing experience by: (i) applying an IG analysis as a method of reflection on medical shadowing in relation to the intended EL goals and (ii) analyzing students’ reflections on their visual representations of their EL outcomes: emotional intelligence and empathy, professionalism, teamwork, and leadership. This study contributes to the area of research on undergraduate medical education utilizing a novel IG (Lacković, 2018) analytical approach in a study that investigated the visual representation of effective medical doctors’ attributes through student posters containing photographs,

and drawings created at the completion of their medical shadowing programme at a large hospital in Qatar.

2.5 Research questions

- **Overarching Research Question:** What are first-year students’ reported experiences of a medical shadowing programme at a U.S. medical college in Qatar, and what do their opinions suggest about professional identity formation?
- **RQ1:** What are the students’ perceptions of a graphic artefact (photograph/drawing) representing the intended learning outcomes of the experiential learning programme: professionalism, emotional intelligence and empathy, teamwork, and leadership?
- **RQ2:** How do students interpret the elements of medical practice they identify and reflect on in relation to the intended outcomes of the programme?

3. Theoretical framework

The advantage of using multimodal teaching-learning methods through EL lies in providing a well-rounded experience in which textual, aural, linguistic, spatial and visual resources are used to meet the needs of students with diverse learning preferences (Mayer, 2001; Papageorgiou & Lamas, 2017; Cope & Kalantzis, 2009). Multimodality has been incorporated in this study by requiring participants to use an artefact, in this case a photograph or a drawing, to illustrate and reflect on their EL journey. Inspired by EL theory, this study is framed by the following four stages of the learning process identified by Kolb (1984 cited in Dunn, 2002): *concrete experience*, *observation and reflection*, *abstract conceptualisation*, and *active experimentation*. The first three stages – *concrete experience*, *observation and reflection*, and *abstract conceptualization* - will be used to analyse the results and draw the appropriate conclusions.

4. Research design

For the EL project, I decided to incorporate the use of visuals as a tool to enrich the teaching and learning experience. Since this method has not been used before in such a context, students were given detailed instructions towards completing their final project by:

- using a photograph or a drawing that represents the topic they were most interested in,
- applying the IG analysis to the image or drawing by describing the elements of the picture, denotation, and connotation,

- writing a narrative text that summarises and articulates their reflections.

Students' work resulted in 13 artefacts and reflections: a visual artefact (photograph or drawing) followed by a narrative text that analyses the visual artefact and links it to one of the four main topics of the EL project.

To perform the IG analysis, this study follows Peirce's (1991) semiotic system that depicts three components:

- Representamen (R): refers to the sign (Ma, 2014), in this case the image elements and the space and time in which the picture was taken, or the drawing was produced (Lacković, 2018).
- Object (O): is what the sign signals to, "something that happened and was [captured] at one point in the past. It manifests meaning via an interpreter" (Lacković, 2018).
- Interpretant (I): refers to the meaning of the sign, it "relates to and mediates between the representamen and the semiotic object [in order to bring the] interrelation between them" (Merrell, 2001, p. 28).

These three components cannot be separated and should be analysed in relation to each other (Lacković, 2018). However, due to the focus of this study, the limited time frame, and the richness of data collected, the unit of analysis

for this study will be students' reflections on their EL project that were represented through the use of narrative reflections.

The approved study information sheet and ethical consent forms were shared with the students who participated in this study prior to starting the data collection. Out of 16 students enrolled in the course, 15 agreed to participate in the study.

A qualitative approach to data collection was undertaken in this study. Qualitative data consisted of students' reflections on their EL experience using a photograph or a drawing artefact that represents one of the four themes that were chosen for students to read prior to their visits and to guide their weekly discussions. Students' reflections were uploaded in NVivo, a software used to analyse qualitative and mixed-methods data (www.qsrinternational.com/nvivo), and relevant text was coded using nodes, or trends in students' responses, that can help identify themes to be later analysed in light of the topic, the theoretical framework, and the literature review.

5. Findings

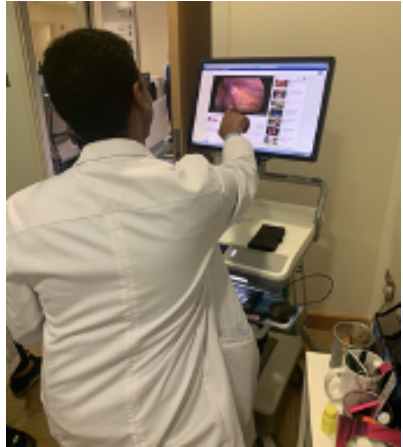
Students' reflections on their final EL project resulted in 13 IG analyses. Table 1 summarizes the results.

Table 1. Students' reflections on their IG divided by themes

Students' Main Themes	Students' Reflections on their Inquiry Graphics
S1 Teamwork  A team of 10 professional healthcare workers after performing a daytime surgery at hospital. The bed is placed in the middle of the picture as it serves the main purpose of the picture, which is surgery. The group looks happy and proud of their workspace.	Teamwork is an aspect that is beneficial for any organization. The picture represents many essential characteristics. As Cook and Brunton (2018) stated in their article, when diversity is present in the team, it will result in the improvement of team management and productivity. Relating to the hospital visits and the picture, I realized that the team that works there is multinational. There is a massive demand for the hospital from the international patients with different cultures and standards. Surprisingly, at the hospital I found that when a healthcare worker is absent, the schedule was packed with patients and difficult to manage. Pfaff and Huddleston's (2003) article shows the deficiencies of teamwork when stating that teamwork can have disadvantages toward the individual's idea of all parts of the field. In the picture, doctors and other healthcare workers are passionate and happy. The postures and smiles show their professionalism and chemistry in the team. The unified uniform shows professionalism. At first, I did not think of the uniform as an important element; however, I came to the conclusion that it aids workers in differentiating between each other and patients, which increases efficiency and professionalism.

Students' Main Themes	Students' Reflections on their Inquiry Graphics
S2 Empathy <i>Picture not reproduced due to copyright issues</i> This is a picture that shows an Interaction between the doctor and patient. The doctor is holding the patient's hand for reassurance and to comfort the patient. The doctor is probably delivering bad news and held the patient's hand to comfort them.	Empathy means a lot to me as I observed it first-hand in the EL program. What struck me the most was how empathy from the doctor affected the patient. We read a lot about how empathy makes the patient feel better, but I doubted it a bit. It was hard for me to believe that the patient knows how the doctor feels. I thought the benefits of empathy were limited to the doctor and that doctors would provide better care if they were able to empathize with the patients. What I found out after the visits was that the patients are able to sense if the doctor is empathizing with them or not, and it reflects on the patient's mood. Patient-Doctor Relationship I realized through the visits that first-time patients were very uncomfortable and crying all the time, which often made it harder for the doctor to examine them. However, returning patients were fine and very happy to see the doctor. This goes to show how important maintaining a good patient-doctor relationship is because it makes it easier and more efficient for both the doctor and the patient. One moment that really showed me how important this relationship is happened when a mother and her daughter visited the clinic. The girl had reflux in her kidney and this case has many procedures. After the doctor explained the different procedures and pros and cons of each, he asked her which one she preferred, and she answered with "I trust your choice whatever you see best."
S3 & S4 Teamwork, Empathy and Communication Barrier Students 3 and 4 shadowed as a pair and collaborated on the image connotations.  <i>Source: Student Picture</i> One male medical student (left) and two female nurses (right) are paying attention to the physician's (center) explanation. The female physician is using a pen to explain the ultrasound scans shown on the portable desktop screen. The medical student and the nurses are focusing on the explanation provided by the physician.	Collaboration and effective communication are critical aspects of healthcare professions. When doctors, nurses, and allied health professionals work together as a team, the patient benefits from this teamwork through attentive care and empathy. The picture embodies the importance of teamwork in medicine by representing how the multidisciplinary team interacts and collaborates with each other. The photo solidifies how interprofessional relations, such as teamwork, have an impact on the educational and social atmosphere of a given profession. Furthermore, the photo is a splendid example of how one can overcome communication barrier in medicine by having a commonly shared goal, efforts, plans and treatments between physicians regarding a specific patient. During our visits to the hospital, I noticed how a successful physician has a wide range of skills and attitudes to deal with patients. For instance, physicians use various skills in difficult situations, such as showing empathy, responsiveness, and patience. In addition, I realized that treating patients in a whole manner was critical for doctors to build a strong bond between their patients. On the other hand, I also noticed how patients felt secure and safe when their physician showed a sense of responsibility and honesty. The shadowing experience at the hospital is one of the most prominent experiences that provided me with the opportunity to observe clinical multidisciplinary team meetings and other processes firsthand. I was able to become more aware of the challenges of the medical profession. Consequently, I came to appreciate each individual's role in providing the maximum effective health care for each patient and their family. Through this experience, I realized that treating patients in a holistic manner was an essential key for doctors to build a healthier relationship with their patients.

Students' Main Themes	Students' Reflections on their Inquiry Graphics
S5 Emotional Intelligence <i>Picture not reproduced due to copyright issues</i> Figure 1 depicts a mother gently holding her child's hand to comfort her, yet the physician may also have played with the child to be able to check her progression after birth. Physicians are required to present a genuine and empathetic character when dealing with their patients. In this case, the doctor communicates well with the mother to gain her trust and acceptance of the treatment the doctor might prescribe. Part of the medical care includes the physician presenting professional and empathetic treatment.	Birks and Watt's (2007) article "Emotional intelligence and patient-centered care" introduces readers to the importance of a patient-focused system when a patient visits his/her doctor. Physicians have a variety of emotionally intelligent traits to encompass, yet the most crucial quality is being understanding and comforting toward a patient's situation while balancing work stress. Dr. Sanoj was the last neonatologist we shadowed, and he presented many components of professional empathy. Not only did he care about the newborn's health but was keen to understand the mothers' opinions and how they were coping with the situation. The doctor integrated his personalized way of communication with the parents' culture, using well-known phrases in the Arabic language to comfort the mothers. Words like "mashallah" sparked a heartening scene between the mothers and Dr. Sanoj because they felt like someone cared about their newborns as much as they did. An empathetic element is required within hospital teams, especially during ward rounds, because physicians may be too preoccupied with the physical health of the patients and forget they are also in control of the patients' emotions; therefore, other members of the team are responsible for such responsibilities. Psychologists at the hospital are integrated into this team, and they cater to the needs of the mothers and infants to ease any distress. During our shadowing experience, I noticed that physicians who are able to emotionally understand people are more valued by parents compared with doctors who may disregard this empathetic sense of treatment, which means people value humane characteristics more than intellectual skills.
S6 Teamwork and Professionalism <i>Picture not reproduced due to copyright issues</i> The team is examining a mannequin as a part of their medical training. They might have a treatment plan as each member is doing something in which they all complete the task together. One female is examining the patient; the man on the left of the picture is delivering important information about the ventilator values; the woman on the right of the picture is pointing to the iPad; and lastly, the man on the right is writing notes about the patient's situation and might be accessing his file to read his medical history.	Before the first hospital visit, I read an article on how doctors should be professional and be on top of their work (Block et al., 2018). But, I was surprised as I saw different concepts in the real world. Doctors were professional but had a different term to define professionalism. I noticed that they aim to put patients' care first and then everything else next. Doctors did not care about patients being late as the hospital is a private hospital and doctors change their schedule for the patients' preference. Other visits Nonetheless, after that visit I noticed that the doctors develop certain skills in the department. For instance, the doctors and nurses take care of each other and cover for whoever is busy. Moreover, the doctors discuss the medical cases to look for the best possible treatment and through that they share knowledge. Also, doctors try to fix a schedule through booking patients' appointments and procedures ahead of time to be as efficient as possible. Besides, doctors from different departments, like the fetal department, work closely with the obstetrics department to take care of both mother and fetus.

Students' Main Themes	Students' Reflections on their Inquiry Graphics
S7 Emotional Intelligence  Source: Student Picture A male holding a sheep's heart in a dissection session at the biology lab	How could a small piece of meat, not even the size of one's fist, control one's happiness and joy, sadness and grief, anger and rage, love and devotion? Why should outcomes of such a little blood pumper affect one's future and career? Initially, I thought academic success was the most critical aspect in one's medical journey; however, after seven visits to the hospital, interacting with great scientists and observing exceptional doctors, my opinion shifted. I was oblivious to the different facets the medical field demanded of one to stand out. In particular, to be emotionally intelligent, a skill many believe crucial in today's medicine, is to be able to relate and feel the patients' discomfort, empathizing with their pain, treating them as a whole. This is something I witnessed first-hand while shadowing at the hospital in the pediatric neurology department. As the doctors interacted with the children, they were capable of easing and absorbing their anxiety, extracting the needed information from them without freaking them out. What I have experienced in my visits goes hand in hand with Morales' (2014) paper, which states that effective doctor-patient communication is directly related to the healthcare provider's emotional intelligence. Looking at a heart of a sheep and reflecting on my literature review, I found myself asking: how could a small piece of meat, not even the size of one's fist, control one's happiness and joy, sadness, and grief, anger and rage, love and devotion? Why should outcomes of such a little blood pumper affect one's future and career? My uncertainty has a scientific basis, as many point out that emotional intelligence is based on false beliefs and proprietary data (Birks & Watt, 2007).
S8 Professional Identity  Source: Student Picture A male Doctor explaining a video of a surgery to surrounding students and engaging them in the art and precision of medicine. The doctor is teaching and trying to make the students understand what is happening on the screen.	Professional identity is a topic that was accentuated by my visit at the hospital as I encountered the healthcare environment in its raw form where I recognized the interpersonal skills in the environment as well as witnessed the medical hierarchy present in the healthcare system. An article I have researched highlights the importance of hands-on experience in the medical field as it helps realize what's in the textbooks into real life interactions as well as the different aspects that students have recognized as important such as, "attention, representation, and affiliation" (Miller et al., 2014). This is emphasized in the picture that I have chosen to analyze from my visit to the hospital which shows a doctor teaching us about a surgery from an educational video online, and relating it to the patient that we have seen minutes before then. This is significant as it shows the dedication of the attending physician and his professional character as well as a situation in which we learned something new that we wouldn't have otherwise known. The picture embodies the professional identity of the doctor. It shows that he is reinforcing his professional identity through teaching and engaging those around him in what is happening on the video on the screen. Professional identity requires building and developing your character in the way that you act and present yourself to those around you and in the medical field as well as re-establish it through teaching and learning. This candid image symbolizes the professional character of the physician by showing him in an environment where he is devoting his time and effort to teaching and relating classroom studies to real life experience through the video he's playing on the computer at the hospital.

Students' Main Themes	Students' Reflections on their Inquiry Graphics
S9 Child Advocacy <i>Picture not reproduced due to copyright issues</i> The picture illustrates a physician having a closed meeting with an infant patient and her caretaker.	Child advocacy is crucial in medicine as it mainly contributes to the children's overall health. As we can observe from the previous picture, the infant is comfortable enough to reach out for the paper which is placed in the physician's hand, and that shows the physician's ability to generate a suitable environment in order to treat the patient. Advocate physicians' main goal is similar to ordinary physicians which is to heal the patient as a whole, and not only the disease, but advocates concentrate specifically on the surrounding environment of the patient. They put as much effort as they possibly can to ensure the safety and health of the patients and their environments. This experience has truly been so encouraging and motivational, because it gave me a boost of confidence about what I aspire to be in the future. I have learned from those six visits to the Pediatric Emergency department at the hospital that physicians are not only doctors who prescribe medicine to sick people, but advocates who speak up for those who are unable to. Children rely on their caretakers to provide a healthy environment around them in order to grow and become reliable adults.
S10 Emotional Intelligence <i>Picture not reproduced due to copyright issues</i> A picture of a patient high-fiving a doctor with her mother close by. Doctor has succeeded in building a rapport. Consequently, the doctor has gained the mother's approval, making the mother and the patient comfortable with medical situations.	This picture accurately shows the positive effects of emotional intelligence in medicine. Specifically, we can understand that the doctor is able to control her emotions in front of the child patient when delivering upsetting news. Also, we can determine from the picture that the doctor is presenting a different level of emotion to the child patient as compared to the mother as she is giving the patient a high-five. This indicates that the doctor is being friendly to the patient, yet professional and polite to the mother. It can be observed in the background of the picture a number of interactive games that denotes that the doctor chose an environment where the child is relaxed. The brightness of the picture reflects the positive environment in the hospital. Therefore, the positive atmosphere encourages doctors to be motivated to work hard and that will accordingly prevent burnout. This will reflect on treating the patient as a whole rather than the disease. This correlates with what was said in 'association between emotional intelligence and doctor burnout, job satisfaction and patient satisfaction' by Weng when it was explained that those with higher emotional intelligence rates were less likely to suffer burnout or exhaustion (Weng et al., 2011).
S11 & S12 Empathy & Language Barrier  <i>Source: Student Drawing</i> Students 11 and 12 collaborated on the drawing and reflection. A middle-aged male doctor is holding a baby boy in his lap. The doctor is holding the stethoscope to	This image portrays the doctor-patient relationship between a pediatrician and an infant, highlighting its nature as being compassionate. It also provides an archetypal relationship that physicians should strive to achieve with their patients. The doctor is engaging the baby by allowing him to play with his stethoscope, completely breaking the stereotype that depicts doctors as being emotionless and harsh. This supports Moscrop's (2001) claim that empathy should not be defined as "an appropriate, controlled, professional response to the patient's affective reaction to illness" (p. 59) as it makes empathy seem more robotic rather than emotional. On a deeper note, the fact that the doctor is allowing the baby to listen to his heart illustrates the doctor's efforts to gain the patient's trust as he would not allow anyone to randomly listen to his heart otherwise. Even though the patient is too young to understand this, this action goes a long way in strengthening the bond between the doctor and the patient. The facial expressions and body language of the doctor and the patient convey that they are comfortable in each other's presence, which is really important as it melts away the border caused by the age gap between them. What can be implied, rather than observed, from this picture is how the parents would trust the doctor easily due to this simple action as he is making the baby feel happy and relaxed.

Students' Main Themes	Students' Reflections on their Inquiry Graphics
his heart for the baby to listen. The baby is playing, thinking it is a toy, with the other end of the stethoscope as he does not know what to do with it. Both the doctor and the baby are smiling indicating they are enjoying their encounter.	During our visits to the hospital, we were assigned to shadow the doctors in the Neonatal Intensive Care Unit (NICU) and the Obstetrics (OB) clinic. Through following the doctors, listening to what they say and carefully observing what they do, we were able to see their interactions with their patients and how they empathized with them. We related this to when Moscrop (2001) stated that some doctors preferred to show empathetic remarks rather than truly empathizing with their patients. The doctors we shadowed at the hospital proved to us that not all doctors find the easy way out by sticking to the “kindly word, the cheerful greeting [and] the sympathetic look” (Moscrop, 2001, p. 60). The way the doctors held the babies compassionately in their arms and even talked to them conveys that they are truly empathizing as it is extremely hard to pretend to care this much. What we witnessed during our visits confirmed the complexity of empathy in comparison to sympathy as stated by Brounsuzian (2013). An example we observed of empathy was the simple gesture of the doctors placing their hands on the patients’ shoulders, which might reflect the doctors’ concerns for their patients. As stated in Garden’s (2009) article, doctors need to show some empathy towards their patients to aid their treatment. Moreover, a smile from a doctor is considered a symbol of empathy; it symbolizes the beginning of a trustful relationship between doctors and their patients (Beamish et al., 2019). One of the highlights of our experience at the hospital was how we got the opportunity to listen to a baby’s heart during one of the patient’s ultrasound appointments. It was truly a beautiful moment to experience; it can easily bring tears of joy to our eyes. Even though we observed many strengths in the physicians’ abilities to display empathy at the hospital, there is always room for improvement. In the NICU, the only interactions that required words were with the parents rather than the patients as they were babies. We noticed that one aspect affecting the natural flow of communication between doctor and parents was the language barrier. The hospital offered interpreters in some cases where language was an obstacle; however, there were other cases where the language was spoken, but not fluently. This can lead to information being lost in translation and, therefore, being misinterpreted. Furthermore, empathetic remarks can be interpreted differently in different parts of the world. This introduces the issue of cultural barriers. In order to overcome this, physicians must be educated on what different gestures or sayings might mean, at least in the country they are living in.

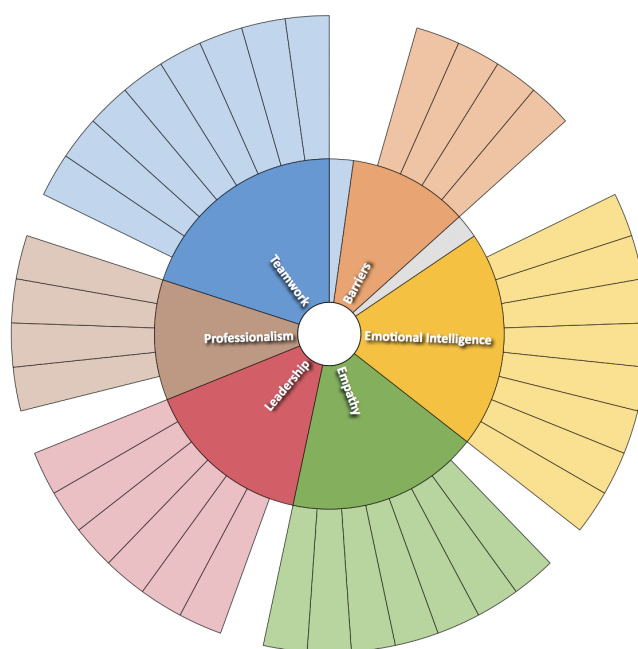
Students' Main Themes	Students' Reflections on their Inquiry Graphics
S13 Empathy  <i>Source: Student Drawing</i> The patient appears to be free from tension and anxiety, since her baby is placed in what seems like the safest place in her mind. Moreover, the obstetrician and infant are meeting for the first time after the obstetrician delivered the infant, hence the warm-looking, affectionate encounter. Correspondingly, the obstetrician and infant are smiling, perhaps because the baby feels comfortable being in the obstetrician's arms. In addition, one can assume that the obstetrician is transforming from her serious professional identity into something rather similar to an empathetic mother, who genuinely cares for her child. Therefore, the baby appears to be held in such a peaceful way, a position that most probably reminds him/her of the position he/she took in the mother's uterus. Furthermore, the obstetrician has a stethoscope wrapped around her shoulder perhaps she is examining the infant for any ailments.	The drawing personifies the concept of empathy in its most authentic form between the obstetrician, the infant she delivered, and the mother. All members illustrated on the drawing are joyful, as the obstetrician meets the newborn for the first time since delivery. The obstetrician is tightly holding the baby in her arms, as she is performing an examination to check if the infant's condition is well, having heard what the mother had conveyed. The mother is in tranquility since the most precious entity to her is somehow being protected by a guardian, who delivered her most valued possession.

Students' Main Themes	Students' Reflections on their Inquiry Graphics
S14 Leadership  <i>Source: Student Drawing</i> Healthcare workers appear to be engaged in the discussion. The nurse and female doctor seem attentive and involved in the discussion that looks like it is led by the doctor in the center. Female doctor talking while pointing at something.	Throughout the Program, I joined one of the daily rounds in the Neonatology department. The rounds included interdisciplinary healthcare professionals that came from distinct specialties of the care team to discuss treatment plans for the patients under their care. The team members were to examine the patients' conditions and health status. As the physician leader listened to the nurse's feedback, he gazed at me to see if I had any questions regarding the information being conveyed by the nurse, and gladly I had. My question was "what does emphysema mean?" The doctor was about to answer; however, he decided to transfer the question toward the female doctor, who was a "fresh," "young" resident. The reason why the physician handed over the question to the other healthcare professional was to make sure that his fellow medical team member knew her information and knowledge compulsory to treat the patients. While I was shadowing the main doctor of the Neonatology department, I observed how his leadership skills facilitated the rounds. I believe the physician possessed the characteristics of a transformational leader. This explains why his guidance made the rounds enlightening. He is one of those leaders who work primarily in the essence of initiating positive changes to their institution, team, and others (Sfantou et al., 2017). He made monumental efforts to motivate the other healthcare professionals. For instance, I heard him assuring the other members of the medical team by saying, "we will do everything we can and more to provide the best quality care for our patients!" The physician was one of those individuals who set exacting expectations for themselves and do [did] one's best to achieve it, yet typically achieve beyond, because of their staggering passions that stems directly from their mindset. Medical leaders ensuring that everything is to the best of standard is strongly supported by the article, where the author stresses medical leaders are those who check the healthcare system and the delivery of care on a regular basis (Chen, 2018). The picture exhibits healthcare workers in a discussion that is led by the male physician. The physician is asking the female resident a question I inquired about, which is regarding the definition of emphysema, instead of answering the question himself. By doing that, I got to observe his confidence and assertiveness, which encapsulated his key characteristics of leadership. He, in simple terms, wanted to ensure that his fellow junior team member knew her facts and information, as she is dealing with people's lives. This concept was maintained by Chadi (2009), who affirms that good leaders are those who ensure all is to the greatest standard, and that is exactly what the doctor I observed did.
S15 Emotional Intelligence  <i>Source: Student Picture</i> The photo is of an examination room in the hospital. It is clean and the equipment is all in place as no patient was being examined in it at that moment.	This photo illustrates how it is up to the doctor how the patient's experience goes. If the doctor has high emotional intelligence, then the patient will be comfortable and relaxed during the visit, which in turn leads to better treatment. This is supported by the research done by Morales, which concluded that higher emotional intelligence in doctors, results in more accurate diagnosis for patients (Morales, 2014). However, if the doctor has low emotional intelligence, then the patient's experience will be more tense as the doctor cannot adapt to the patient's emotions. Emotional intelligence in doctors is especially important in the hospital – where the photo was taken – as most of the patients treated in the hospital are children. I have witnessed how skilled doctors can adapt to the children's mood and modify the examination process in the room to make it more tolerable for children. The equipment in the room can look scary for a child, so the doctor has to distract the child while using the equipment to check their vitals and senses.

Table 2. Themes and sub-themes that emerged from students' reflections

Recurrent Themes	Sub-Themes
Teamwork	Collaboration Diversity Individual's Role Interprofessional Management Multidisciplinary Multinational Surgery
Emotional Intelligence	Accurate Diagnosis of Patients Being Friendly Controlling One's Emotions Doctor-Patient Communication Holistic Approach to Healing Modifying the Examination Process Patient Emotions Satisfaction
Empathy	Being Compassionate Care Genuine Humane Patient-Doctor Relationship Speaking up for Those Unable to Trust
Leadership	Achieve Beyond Expectations Confidence and Assertiveness Initiating Positive Change Motivation Setting Expectations Transformational Leader
Professionalism	Dedication Patient Care First Sharing Knowledge Uniform

Recurrent Themes	Sub-Themes
Overcoming Barriers	Culture Information Being Lost in Translation Language Misinterpretation
Other themes that were mentioned only once in students' reflections	Academic Success Child Advocacy Professional Identity

Figure 1. Six overarching themes extracted from students' reflections

Using NVivo to gain rich insights from the students' reflections, six overarching themes were identified. *Teamwork* and *Emotional Intelligence* were the most recurring themes, followed by *Empathy*, *Leadership* and *Professionalism*. It is worth noting that although *Emotional Intelligence* and *Empathy* were grouped together as one theme in the reading requirements, students' reflections divided them into two different themes. Another finding that was noticed from the data in NVivo is the emergence of a new theme: *Overcoming Barriers*. Three other themes were vaguely mentioned in students' reflections – *Academic Success*, *Professional Identity*, and *Child Advocacy* – and these have been grouped together. In total, results from students' reflections generated six

main overarching themes (see Figure 1 and Table 2) that are discussed in the following section: *Teamwork*, *Emotional Intelligence*, *Empathy*, *Leadership*, *Professionalism*, and *Overcoming Barriers*.

6. Discussion

Although this study used one method to collect data, which is the students' reflections on their EL through the use of visual artefacts, the amount of qualitative data collected provided a wide range of results that needed to be organized in overarching themes. Using Kolb's four stages, the results of this study are discussed in light of the first three stages as premedical students are not equipped with the conceptual knowledge and practical skills to apply them in a clinical setting, an area that could be included in the active experimentation stage.

6.1 Concrete experience

From students' reflections, it can be concluded that students acknowledged the importance of having hands-on experience in a real-life setting. Students 2, 6 and 8 (or S2, S6 and S8) have clearly mentioned the value of first-hand experience in the real world and how it differs from textbooks and classrooms. S3 and S4 commented that through EL, they were "able to become more aware of the challenges of the medical profession." This is further validated by research literature that emphasizes real-world exposure. Authentic interaction with doctors and encounters with patients through shadowing and observations lead to a rich understanding of physicians' roles, their contact with patients, communication with other healthcare providers, and decision-making responsibilities (Wang et al., 2015). Nonetheless, real learning is fostered not only through concrete experience but also through reflection on the learning that takes place after observations in hospitals.

6.2 Observation and reflection

Six students out of 15 mentioned in their reflections how important their observations were in order to see the applicability of what they learned from the reading materials and how this had impacted their learning and provided them with the opportunity to witness 'empathy', 'leadership', and the challenges faced by multidisciplinary teams. S9 considered the shadowing experience to be "encouraging and motivational" and boosted premedical students' confidence in pursuing medicine. Baker-Loges and Duckworth (1991) ascertained the role of EL in helping students understand the requirements of a specific professional domain and facilitate

their career decision-making. Furthermore, the important act of reflecting on the shadowing experience can likely sway premedical students' choices in pursuing a particular medical specialty (Kitsis, 2011).

6.3 Abstract conceptualisation

All students' reflections imply that the programme has impacted their understanding of the demands of a career in medicine. In fact, some students came to realize that some details that we usually ignore are important in representing professionalism and teamwork, such as S1's reflection on the importance of uniform for medical team members. Other students' reflections mentioned the importance of EL in understanding the role each individual plays in the healthcare system due to the complexity of healthcare organisations (S3 and S4). The participants' reflections on this complexity are validated by research undertaken by Block et al., (2018) who concluded that shadowing premedical students recognised the complexity of healthcare systems, especially the importance of teamwork and collaboration among healthcare teams as the most important approach to patient care. S9 realized through this experience that doctors have a more humanitarian role that goes beyond healing to "speak up for those who are unable to." This observation brings up the important need for social justice in healthcare. In fact, this is one of three principles described in the Charter on Medical Professionalism: "the principle of primacy of patient welfare, the principle of patient autonomy, and the principle of social justice" (DasGupta et al., 2006, p. 246; ABIM Foundation, 2002). S11 and S12 were also able to link the importance of body language in communication and how a 'smile' can be a universal sign of trust and empathy.

7. Conclusion

Reporting on participants' analyses of visual artefacts and their reflections, this study argued for innovating teaching and learning through the integration of pedagogy to socialize premedical students early in the medical profession. The study also advocated for incorporating multimodal methods in medical education, particularly an IG tool, for students to engage in the learning process and reflect on their disciplinary field observations. Using multimodal methods to reflect on observerships in experiential medical education increases learner engagement and stimulates critical thinking in delving deeper in the shadowing experience to extract richer meaning. This enriched meaning-making enables premedical students to comprehend the demands of a specific professional domain and facilitate their career decision-making (Baker-Loges & Duckworth, 1991).

Furthermore, making rich sense of a shadowing experience is optimal with multimodality because it is a student-focused approach that actively involves students in selecting and using the most relevant resources for their learning needs (Mayer, 2001). Multimodality integrates various tools, such as visual, textual, and verbal representations for a deeper understanding. It “provide[s] different types of resources to the student for stimulating learning in meaningful ways within and across disciplines” (Papageorgiou & Lameris, 2017, p. 133). As evidenced by students’ analytical reflections on their visual artefacts, six main overarching themes emerged to define essential qualities of a physician: *Teamwork, Emotional Intelligence, Empathy, Leadership, Professionalism, and Overcoming Barriers*. Students enhanced their health literacy skills by interacting with physicians, observing doctor-patient communication, and participating in community service (Goldstein et al., 2014; Koponen et al., 2012; Stepien & Baernstein, 2006).

Historically, narrative medical education has focused more on textual than graphic analysis in teaching critical thinking and analysis to medical students. Therefore, providing a balance between narrative analysis and graphic analysis as parallel practices in narrative medicine is capable of enhancing teaching and learning in medical education. This overlapping process of what Helle (2011) labels “close reading” paired with “close seeing” deepens the reflexive capacity of medical students to value empathy in understanding human suffering. Nonetheless, although medical practice is a multimodal experience, EL in medical education facilitated through a shadowing experience has been shown in this study to enrich the student experience, especially when incorporating multimodality.

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