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ANDRAGOGY APPROACH IN CONDUCTING FORENSIC CRIME SCENE INVESTIGATION: A SUMMARY OF TEACHING PRACTICE

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Abstract

Like student-centred learning, andragogy is concerned with adult learning through self-directed learning, active participation, and collaborative problem-solving. While andragogy has been extensively recognised as a viable method for adult learning, its application presents several obstacles in higher-level education institutions. This article aims to demonstrate how to design and implement this andragogical strategy, particularly in Forensic Science programs. Specifically, this article discusses an andragogical approach to conducting a crime scene investigation as a course assignment. This activity starting with strategizing the teaching plan with students, setting up the crime scene, crime scene reconstruction, presentation of the investigation results, peer evaluation, and getting the student feedback. This activity is often used in Forensic Science programmes to provide students with hands-on experience in processing a crime scene, collecting evidence, and analysing evidence. Typically, instructors prepare crime scenes for students to investigate. Instead of providing a pre-constructed crime scene, students are given the opportunity to create and produce their own crime scenes. This indirectly demands dedication, group cooperation, and wisdom in applying all their knowledge and experience in Forensic Science. This activity provides space for creative thinking among students, especially in creating crime scenes, evaluating evidence materials, and reconstructing crime incidents using the obtained evidence. This article also highlights the need for obtaining student feedback, as well as the knowledge generated, and challenges faced by educators in applying andragogy in learning activities.

Keywords: Andragogy; crime scene; forensic investigation; problem-based learning

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Abstrak

Andragogi adalah kaedah pembelajaran berpusatkan pelajar yang menfokuskan orang dewasa melalui konsep pembelajaran terarah kendiri, penyertaan aktif, dan penyelesaian masalah secara kolaboratif. Walaupun kaedah andragogi telah diketahui secara meluas sebagai tatacara pengajaran yang sesuai untuk pembelajaran orang dewasa, aplikasinya di institusi pengajian tinggi adalah terhad. Artikel ini bertujuan untuk menunjukkan cara merancang dan melaksanakan strategi andragogi khususnya dalam program Sains Forensik. Secara khusus, artikel ini membincangkan pendekatan andragogi dalam mengendalikan aktiviti siasatan tempat kejadian jenayah sebagai tugasan kursus. Aktiviti ini bermula dengan perbincangan pelan pengajaran bersama pelajar, persiapan tempat kejadian, pembinaan semula tempat kejadian, penyampaian hasil siasatan, penilaian rakan sebaya, dan mendapatkan maklum balas pelajar. Aktiviti ini sering digunakan dalam program Sains Forensik untuk memberikan pengalaman kendiri kepada pelajar dalam memproses tempat kejadian jenayah, mengumpulkan bukti, dan menganalisis bahan bukti. Kebiasaannya, kejadian jenayah telah disiapkan oleh tenaga pengajar untuk pelajar menjalankan siasatan. Sebaliknya, para pelajar dikehendaki untuk merancang dan menghasilkan senario dan jalan penceritaan mereka sendiri. Ini secara tidak langsung memerlukan dedikasi, kerjasama dalam kumpulan dan kebijaksanaan mereka mengaplikasikan segala pengetahuan dan pengalaman mereka dalam Sains Forensik. Aktiviti pembelajaran seperti ini memberi ruang kebebasan berfikir secara kreatif kepada para pelajar khususnya dalam mencipta tempat kejadian jenayah, menilai bahan-bahan bukti, dan membina semula kejadian jenayah menggunakan bahan bukti yang diperolehi. Artikel ini juga mengetengahkan keperluan mendapatkan maklum balas pelajar, pengetahuan yang dijana, serta cabaran yang dihadapi oleh tenaga pengajar dalam mengaplikasikan andragogi dalam aktiviti pembelajaran.

Kata kunci: Andragogi; tempat kejadian jenayah; penyiasatan forensik; pembelajaran berasaskan masalah

1.0 INTRODUCTION

Learning is the most essential means of personal development. Learning could be formal, similar to what occurred in school, college, and university. In contrast, informal education occurs outside of these institutions. In formal education, there are two learning approaches: (1) teacher-centred learning (TCL), which is ideal for lower-level education such as elementary and secondary school, and (2) student-centred learning (SCL), which is typically used in higher education to develop lifelong learners (Marín, 2022).

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In tertiary education, the change from TCL to SCL is intended to equip lifelong learners by empowering them to co-design their learning activities. By using SCL, students become knowledge makers rather than knowledge transmitters, and teachers take on the roles of facilitators and scaffolding providers (Lee & Hannafin, 2016). SCL demands educators who are capable of designing and facilitating learning experiences that promote student growth and learning. Educators have an active role in fostering collaborative, critical-thinking, and problem-solving atmosphere. In addition, they offer direction and feedback to aid students in reflecting on their learning and making progress toward their objectives. Educators must identify the scope of the study, strategize the learning and teaching activity, and conclude the session with a summary.

Andragogy, like SCL, is concerned with adult learning through the concept of self-directed learning. This strategy encourages students to take the initiative in diagnosing their learning requirements, establishing learning goals, discovering human and material resources for learning, selecting and executing learning strategies, and evaluating learning outcomes, with or without assistance from others (Marín, 2022).

While andragogy has been extensively recognised as a viable method of adult learning, its application presents several obstacles. Several obstacles exist when conducting andragogy, including (1) misconceptions and misapplications of the andragogy approach; (2) educators lacking andragogy skills; (3) students lacking prior knowledge and experience; (4) a diverse group of students with varying levels of knowledge, experience, and skills; and (5) some adult learners requiring structured instruction to master new skills and knowledge (Lee & Hannafin, 2016; McKenna & Quinn, 2020; Reischmann, 2017). These factors have led educators in higher education to still practice TCL during learning activities.

While online learning has its benefits, in forensic science, hands-on training and practical experience remain essential. Criminalistics is one of the core courses in the Forensic Science program in our institution taken by second-year students. This course introduces students to a basic element of scientific investigation for crime scene reconstruction. Project-based learning is one of the hands-on training methods that have been demonstrated to improve student learning, motivation, autonomy, and the ability to create real-life experiences (Ngereja, Hussein, & Andersen, 2020; Shin, 2018; Xu & Liu, 2010). Mock crime scene investigation is one topic in forensic science that could be conducted through project-based assignments.

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A mock crime scene investigation is a simulation of a real-life crime scene investigation that is conducted for training and educational purposes. This type of activity is often used in forensic science programs to provide students with hands-on experience in processing a crime scene, collecting evidence, and analysing data. This activity is designed to evaluate several elements such as the evidence documentation and collection method, evidence preservation, proposing appropriate evidence analysis, crime reconstruction, and presentation skills. However, there is a lack of studies that demonstrate a strategy for conducting mock crime scene investigations. In this article, the author reported an andragogy approach in conducting mock crime scene investigation which could be applied in any project-based coursework in terms of preparation, evaluation rubric, student feedback, knowledge creation, and challenges.

2.0 MATERIALS AND METHODS

Considering the importance of all elements, including self-directed learning, hands-on experience, autonomy, peer assessment, and feedback, this article provides guidelines for embedding the andragogy approach in crime scene investigation exercises. The overall workflow of this activity is depicted in Figure 1. On the first day of the semester, students and the instructor discussed how to execute the mock crime scene. Students were divided into three groups of ten. Each group was creating a storyline for their crime scene. Prior to arranging the crime scene, each student group presents a storyline and the associated evidence to the instructors. The instructors then review and offer suggestions to enhance the storyline and evidence, simulating a real crime scenario. Students were also instructed to fabricate a small amount of false evidence with the intent of affecting the outcome of the case reconstruction.

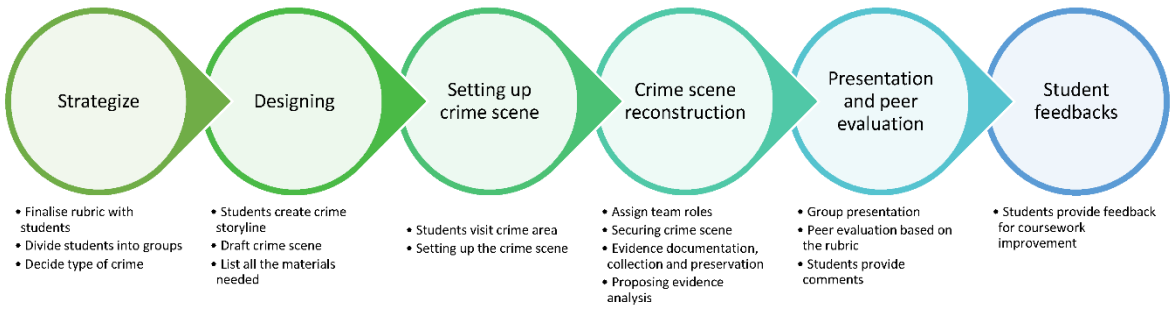

Figure 1. Strategy for conducting andragogy approach in mock crime scene investigation

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Each designer team first sets up a crime scene based on their proposed storyline and evidence. Conversely, the team that initially designed the crime scene will perform the reconstruction of another team's crime scene setup. This allows all designer teams to participate in assessing the reconstructions proposed by the other groups. Each group was assigned a team leader, photographers, sketchers, and evidence collectors. The evaluation rubric was finalized, with students considering (1) securing and sketching, (2) identifying evidence, (3) photographing, collecting, and preserving evidence, (4) describing the analysis to be conducted, and (5) reconstructing the crime scene (Table 1). Basic investigation kits were prepared by forensic laboratory staff, including basic protective equipment such as gloves, head covers, shoe covers, and masks.

Students were given one week to prepare their presentation and slides. The presentation should highlight the collected evidence, packaging, and analysis to be conducted of each piece of evidence. In addition, students were expected to reconstruct the crime based on the found evidence. To promote student engagement, each member of the group that created the crime scene was allowed to evaluate and provide comments on the crime reconstruction. In the end, student feedback was collected to improve this coursework. During the reflection session following the presentation of the crime scene reconstruction, each group unveils the backstory of the crime. Instructors and students engage in discussions regarding the significance of all evidence to enhance the setup of the crime scene and resolve any disagreements about the facts of the crime scene.

3.0 RESULTS AND DISCUSSION

This section focuses on how andragogy was used in a mock crime scene activity, including setting up the crime scene, collecting, documenting, analysing, and reporting the evidence. Assessment rubrics and student feedback were also discussed. Additionally, this part highlights the value the knowledge acquired, and the challenges faced by educators.

3.1 Setting Up the Crime Scene

The three student groups were able to set up their mock crime scenes in three different areas as depicted in Figure 2. The crime scenes were meticulously planned. The freedom granted to the students has inspired them to think imaginatively, utilising all their expertise and knowledge. The preparation of the crime scene has facilitated teamwork and communication within the group. Some students not only rely on the provided materials but also demonstrate initiative by purchasing a portion of the necessary supplies for their preparation. This is yet another value that the students have demonstrated to our awe and appreciation.

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Table 1. Assessment rubric for evaluation of mock crime scene investigation activit

Rating / Criteria (%)	Excellent (4 point)	Good (3 point)	Satisfactory (2 point)	Need Improvement (1 point)	Provide your mark here from 1 – 4
Evidence (2.5x)	*Identify all relevant evidence*	*Left few evidence*	*Identify less than 5 evidence*	*Identify nothing*	*e.g. (2.5 x point)*
Evidence documentation (5x)	*Propose the correct collection and preservation method for all evidence*	*Propose the correct collection and preservation method for most of the evidence*	*Propose the correct collection and preservation method for some evidence*	*Propose the wrong collection and preservation method for all evidence*	*e.g. (5 x point)*
Sketch of the scene (2.5x)	*All important evidence is included with correct measurements and indicators*	*A few important pieces of evidence are missing. Sketch with correct measurement and indicators*	*A few important evidence are missing. Sketch lacks measurement and indicators.*	*Sketch is unable to interpret and missing of measurements and indicators.*	*e.g. (2.5 x point)*
Evidence analysis and expected outcome (5x)	*Propose correct analysis with the right procedure and instrumentations used for all evidence.*	*Propose correct analysis with the right procedure and instrumentations used. for most of the evidence*	*Propose correct analysis with the right procedure and instrumentations used for some evidence.*	*Propose wrong analysis with the right procedure and instrumentations used for all evidence.*	*e.g. (5 x point)*
Crime Reconstruction (7.5x)	*Provide logical and clear crime scene reconstruction by linking ALL collected evidence*	*Provide logical crime scene reconstruction by linking most of the collected evidence*	*Provide logical crime scene reconstruction by linking some of the collected evidence*	*You can't understand the reconstruction*	*e.g. (7.5 x point)*
Presentation Skill (2.5x)	*Amazing performance, smooth, and well organised*	*Well-prepared and understandable*	*Not well organised but still OK*	*To many flaws, loss of many words, and unstructured.*	*e.g. (2.5 x point))*
Total over 100					*/100*

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Figure 2. Three scenarios (A, B and C) of the crime scenes created by students

3.2 Documentation and Collection of Evidence

The three student groups visited the crime scene that had been created by the other group with the required safety gear. Two hours were allotted to secure and collect all the evidence. Initially, they outlined the crime scene and secured it with barrier tape. They then identified potential evidence and assigned numbers to it.

Another important element is evidence documentation through sketching and photography. Students made a rough sketch and a finished sketch of the crime scene with measurements as shown in Figure 3. The evidence was photographed with and without scale before packaging. There are different types of packaging materials, such as paper bags and envelopes, paper boxes, zip-lock plastic bags, and bottles, in a variety of sizes. The specific type of packaging used may vary depending on the nature of the evidence. Proper labelling is crucial to maintaining the chain of custody. The label must include information about the collection, preservation, handling, and storage of the evidence to establish its integrity and reliability. The collection information includes the case details, date, and initials of the collector. However, this activity does not include witness interviews, which are important evidence to provide valuable information and insights about a crime.

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3.3 Analysing and Reporting Evidence

The process of analysing forensic evidence includes the methodical inspection and evaluation of numerous types of evidence to extract pertinent information. Forensic scientists must comprehend the type of analysis that will be conducted on the acquired evidence. So that the evidence might be submitted straight to a laboratory specialising in forensic narcotics, toxicology, DNA analysis, criminalistics, or document analysis. By understanding the evidence's subsequent analysis, it is possible to acquire less unnecessary evidence. Therefore, the type of analysis undertaken for each piece of evidence is one of the evaluation criteria in this activity.

A critical phase of the forensic investigative process is the reporting of forensic evidence. It entails clearly outlining and articulating the results of the forensic study in a way that is backed by science. Students had one week to prepare a slide presentation for their presentation, which was held in an online session.

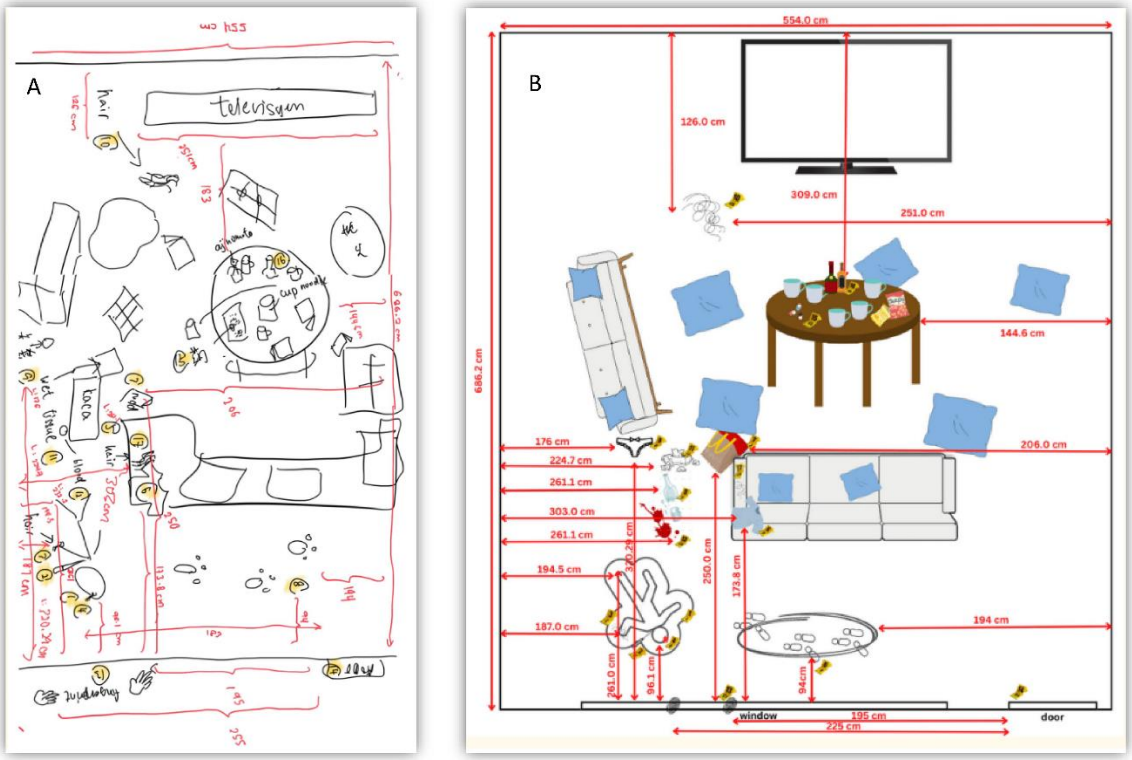

Figure 3. The (A) draft and (B) final sketches of the crime scene illustrated by students based on the crime scene in Figure 2C

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3.4 Student Feedback

Student feedback is an integral part of the education process because it provides educators and institutions with invaluable information about the efficacy of teaching techniques, course content, and the overall learning experience. In this activity, students were asked for their feedback following the presentation. Two questions were posed: (1) What do you like best about this activity? and (2) Any feedback or ideas on how to make it better as presented in Table 2.

In general, students mentioned that the experience of investigating a crime scene was interesting and exciting since it gave them the chance to put the techniques they learned in class into practice and develop a more thorough grasp of evidence collection. They appreciated and gained useful practical experience from the hands-on nature of the activity, which included the setting up of a mock crime scene and subsequent examination. They valued the chance to put their newfound understanding of things like fingerprints, toolmarks, and footprints into practice. They also emphasised the value of cooperation and teamwork in making the activity successful.

3.5 Knowledge Creation

Andragogy is an educational strategy that stresses adult learners' self-directed and independent learning. Through this activity, students have been exposed to a variety of learning experiences, including self-directed learning, hands-on practice, collaborative learning, problem-solving, reflection, and peer evaluation.

Initially, students have no formal education on forensics and crime scene management. This course introduces students to forensic science as their first exposure to the subject. It familiarizes them with the fundamental principles necessary for reconstructing crime scenes through scientific investigation. This mock crime scene activity occurs following the completion of all lectures and lab work activities, aiming to establish a robust foundation in forensic science.

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Table 2. Students' feedback is collected at the end of the activity

What do you like best about this activity?	Any feedback or ideas on how to make it better?
To figure out what had happened in the crime scene	*So fun and great experience ever! Thank you DR :)*
This activity help me a lot in applying the topics that I have learned in GTF200 such as fingerprint, toolmark, and footprint practically.	*Maybe can have more time to prepare the presentation?*
Able to have the experience of investigating a crime scene which let us understand more on the procedure and important things to take note of in CSI	*Can ask other teachers or students to play critical roles such as witnesses or suspects so that we can interview about what they saw, what they heard and etc at the time the crime occurred.*
Very fun activity. I got to experience what is like to investigate a crime scene and follow the process I learned in class. It got me really thinking as if I were a crime scene investigator and gave me a deeper insight into how evidences are collected.	*The time for tools and places discussion*
The preparation of mock crime scene and analysis afterwards, gave the most practical hands on as a forensic investigator	*Give more clear instructions (but the freedom was fun) - to avoid some groups creating references and what not. Overall it is probably one of the fun assignment this semester.*
To play it out in real life, it was a fun way of applying what we learnt.	*Can do outside xxxx haha, or include the lab analysis*
Live experience very interesting and we got know how hard to collect the evidence	*Perfect FUN activity conducted by Dr. xxxx :)*
we get to collect evidence using forensic techniques	*Everything went well and smooth. Thank you, Dr. xxxx the guidance throughout this activity.*
Cooperation between team members to ensure the activity went well. learnt a lot of knowledge from this hands on activity.	*Very interesting and great effort from Dr, lab staffs and also fellow friends. Thank you, Dr xxxx :)*
Hands-on practical how to collect and preserve the evidences properly	*A good activity to expose to inexperienced students on what forensic analysts do at the crime scene.*

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In the previous practice, instructors were responsible for preparing coursework activities, excluding students from the process of setting up the crime scene. Typically, a straightforward crime scenario is established, and all groups will analyze the same scenario. The evaluation of the coursework was solely conducted by the instructor, relying on the samples collected and the preservation methods employed. In the current approach, instead of presenting a ready-made crime scene for students to investigate, they are given the opportunity to design and create their own scenarios. Students also involve in peer evaluation and reflection session to reveal the crime's backstory to everyone. By providing autonomy and accountability, self-directed learning has enabled students to assume ownership over their educational experience. This demanded the students' dedication and, potentially, their ingenuity through the application of all their knowledge and expertise.

Additionally, this project gives students hands-on experience. This can entail collecting, preserving, and analysing evidence. The information and abilities acquired via this activity are consistent with the duties of a forensic investigator and are directly transferable to criminal investigations.

By dividing the students into smaller groups, collaborative teamwork, peer-to-peer learning, communication, and the exchange of ideas and opinions are encouraged. This promotes a sense of shared responsibility and creates an environment in which students can benefit from one another's experiences and insights.

The final task is peer evaluation and reflection. Peer evaluation is an excellent technique for collaborative learning that requires students to reflect on the contributions of their group members. Peer evaluation contributes 50 per cent to this activity, while the instructor contributes the remaining 50 per cent. Meanwhile, during the reflection session, the group of students who created the crime scene revealed the crime's backstory to everyone. In addition, they are given the opportunity to comment on another group's crime reconstruction. Delivering comments in front of an audience requires scientific understanding and motivation. This is another form of student engagement. Amazingly, each crime reconstruction was consistent with the storyline. This demonstrates the significance of each piece of evidence in reconstructing the crime.

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3.6 Challenges

The challenges of implementing SCL culture have been discussed extensively (Kumar, 2016; Wulf, 2019). Due to the flexibility and the student's freedom to explore scenes of interest, it is undeniable that implementing andragogy demands greater effort from educators. It necessitates thorough planning and preparation since it enables students to make decisions, establish goals, and evaluate. Educators must provide a friendly and collaborative learning atmosphere that promotes effective group dynamics, supports meaningful debates, and encourages participants to share their expertise. It also requires educators to adopt a variety of educational methodologies to meet the requirements and preferences of their students. This may require establishing numerous learning paths, adding multimedia resources, or providing content in multiple formats. When needed, educators must be present to assist, answer questions, and provide mentoring.

4.0 CONCLUSIONS

The application of andragogy in a mock crime scene investigation embraces the principles of self-directed learning, active participation, and collaborative problem-solving. Through this approach, adult learners are not passive recipients of information but active participants who construct their knowledge through the exploration and analysis of the crime scene. This strategy capitalises on the abilities and experiences of adult learners by promoting an atmosphere in which they assume responsibility for their learning, apply critical thinking skills, and collaborate. This andragogical technique applies to any problem-based, project-based, blended, or online learning environment. Therefore, it is suggested that educators incorporate andragogy into their learning and teaching activities.

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