The influence of an educator's preferred learning styles on their teaching methods/styles: a reflective evaluation of a real-life case-study

Running head
Preferred learning styles' effect on teaching

Author
John Martin Corkery, BA Hons (Open), MSc, MPhil, PgC in L&T in HE, FHEA

Psychopharmacology, Drug Misuse & Novel Psychoactive Substances Research Unit
School of Life & Medical Sciences
University of Hertfordshire
Room 2F419, Health Research Building
College Lane Campus
Hatfield, Herts.
AL10 9AB

+44(0)1707 281053
j.corkery@herts.ac.uk

Declaration of Interest: None

The influence of an educator's preferred learning styles on their teaching methods/styles: a reflective evaluation of a real-life case-study

Abstract

Background
Many theoretical approaches are applied to learning processes, ranging from behaviourism, humanism, cognitive and constructionist models, to social and situational factors. Theorists and practitioners also consider students' preferred styles of learning, developing models (hierarchical and cyclical) of how these map on to theories, and creating instruments to identify such styles. There is little research on whether educators' preferred learning styles affect teaching methods.

Aims
Key literature about theories of learning and learning styles is reviewed, before exploring the relationship(s) between teachers' and students' learning styles through a case-study.

Methods
The case-study and its original conceptualisation and conduct, without prior knowledge of relevant literature, are described. The author identified his own preferences using a learning styles instrument. A small-scale qualitative survey sought student feedback on the case-study and how they learned.
The results/ issues arising are discussed and related to learning style theory.

Results
It was found that students had similar learning style preferences to the author. Most learning objectives originally envisaged for the case-study were met, if not exceeded in some respects. Some refinements were suggested.

Conclusions
Results from the learning styles instrument concretised the author's understanding of his preferred styles, identifying developmental areas for approaching future experiential activities.

Key words: Case-study; Experiential learning; Learning styles; Reflective evaluation

The influence of an educator's preferred learning styles on their teaching methods/styles: a reflective evaluation of a real-life case-study

Introduction

This article retrospectively examines a cluster of activities used to teach small groups of students about a specific topic, using as a framework the main theories of learning styles. The key questions addressed by this post-hoc analysis are to ascertain if the educator's (author's) preferred learning styles influenced the choice of teaching techniques employed, and whether they matched those of students.

The paper outlines the principal theories advanced about how learning occurs and learning styles, before looking at how learning style preferences can be identified. This is done by reference to some commonly used methods, and illustrated by applying one specific method to identify the author's preferred learning styles. A description of the case-study and the way in which it was originally conceptualised and conducted follows. A retrospective survey approach to obtaining feedback from participants is then explained.

A discussion of the processes involved in these activities and the information they produced seeks to establish: their practicality; what the results have to say about the theories outlined earlier; and what assumptions may have underlain the educator's approaches to these teaching and learning activities. The paper concludes with an assessment of the implications for theory and practice arising from these findings. Suggestions for how future such activities could be conducted are briefly described.

Theories of learning

Theories of learning can be considered as constituting a spectrum, ranging from that of conceptual learning such as the 'Magisterial approach' or 'Master class' through to experiential learning; what Shank (1997) refers to as learning by 'listening' and by 'doing'. Arguably, there are five main theoretical approaches to learning: behaviourist, humanist, cognitivist, constructivist, and social/situational (Table 1).

Behaviourist

Building on Pavlov's (1927) work on dogs demonstrating what has become known as 'classical conditioning' in which an automatic reaction happens immediately in response to a particular stimulus, Watson (1913) argued that since inner experiences were not observable they could not be understood correctly. Laboratory experimentation led to the development of the 'stimulus-response' model in which individuals develop responses to stimuli produced by the environment; these responses are observable. Critical to this approach is the assumption that learning is demonstrated by a change in behaviour, and what is learned by an individual is determined by environmental elements rather than the individual. Central to explaining the learning process are the principles of contiguity (association) and reinforcement (Merriam & Caffarella, 1999). This approach is viewed as the individual being passive and inactive, merely acquiring new behaviours.

Thorndike (1913) argued that the consequences of behaviour weakened or strengthened responses/behaviours. Skinner (1973) developed this into the notion of 'operant conditioning' – the behaviour of individuals is conditioned by reinforcing desired outcomes and/or punishing or ignoring undesired outcomes. The consequences and reinforcement(s) of previous behaviour form part of the antecedents of new behaviour.

When applied to learning, four main tenets are espoused by Hartley (1998): (a) activity is important; (b) repetition, generalisation and discrimination are significant ideas; (c) the preferred principal motivator is reinforcement; and (d) clear objectives facilitates learning, i.e. outcome- and competency- based learning objectives. In this view, the teacher is dominant.

Table 1: Approaches to learning

Feature	Behaviourist	Cognitivist	Constructivist	Humanist	Social/situational
Learning theorists	Thorndike, Pavlov, Watson, Guthrie, Hull, Tolman, Skinner	Koffka, Kohler, Lewin, Paiget, Ausubel, Bruner, Gagne	Piaget, Dewey, Bruner, Vygotsky	Maslow, Rogers	Bandura, Lave & Wenger, Salomon
View of learning process	Change in behaviour	Internal mental process (inc. insight, information processing, memory, perception)	Learners incorporate new information with prior knowledge to construct new meanings for themselves, having compared it with previous information/experience	A personal act to fulfil potential	Interaction/ observation in social contexts. Movement from the periphery to the centre of a community of practice
Learning locus	Stimuli in external environment	Internal cognitive structuring	Ask questions, develop answers, and interact with and interpret the environment	Affective and cognitive needs	Learning is in the relationship between people and environment
Educational purpose	Produce behavioural change in desired direction	Develop capacity and skills to learn better	Making connections between facts, encouraging students to analyse, interpret & predict information	Become self-actualised, autonomous	Full participation in communities of practice and utilisation of resources
Educator's role	Arranges environment to elicit desired response	Structures content of learning activity	Guide, monitor, coach, facilitator	Facilitates development of the whole person	Works to establish communities of practice in which conversation and participation can occur
Adult learning examples	Behavioural objectives; competency-based education; skill development & training	Cognitive development; intelligence, learning and memory as function of age; Learning how to learn	'Hands-on' problem solving; open-ended questions and dialogue	Andragogy; self-directed learning	Socialisation; social participation; associationalism; conversation
Sources: Adapted from Smith (2003), Keesee (2011).					

Behaviourist

Building on Pavlov's (1927) work on dogs demonstrating what has become known as 'classical conditioning' in which an automatic reaction happens immediately in response to a particular stimulus, Watson (1913) argued that since inner experiences were not observable they could not be understood correctly. Laboratory experimentation led to the development of the 'stimulus-response' model in which individuals develop responses to stimuli produced by the environment; these responses are observable. Critical to this approach is the assumption that learning is demonstrated by a change in behaviour, and what is learned by an individual is determined by environmental elements rather than the individual. Central to explaining the learning process are the principles of contiguity (association) and reinforcement (Merriam & Caffarella, 1999). This approach is viewed as the individual being passive and inactive, merely acquiring new behaviours.

Thorndike (1913) argued that the consequences of behaviour weakened or strengthened responses/behaviours. Skinner (1973) developed this into the notion of 'operant conditioning'

– the behaviour of individuals is conditioned by reinforcing desired outcomes and/or punishing or ignoring undesired outcomes. The consequences and reinforcement(s) of previous behaviour form part of the antecedents of new behaviour.

When applied to learning, four main tenets are espoused by Hartley (1998): (a) activity is important; (b) repetition, generalisation and discrimination are significant ideas; (c) the preferred principal motivator is reinforcement; and (d) clear objectives facilitates learning, i.e. outcome- and competency- based learning objectives. In this view, the teacher is dominant.

Cognitivist

A criticism of the behaviourist approach was that too much emphasis was put on individual occurrences, stimuli and observable behaviour. Some psychologists argued that rather than being construed as the sum of component parts, perceptions or images should be approached in a more holistic way looking for patterns (*gestalt*). In learning theory this led to an interest in looking at patterns in an individual's mental processes, i.e. cognition or the act/process of knowing.

Piaget (1926) focused on developments within internal cognitive structures, identifying the following stages of logical mental evolution: sensorimotor, preoperational, concrete operational and formal operational. Knowledge is seen as the interaction between the individual and the environment. Later writers, like Bruner (1960), looked at how these processes could be applied to teaching, advocating learning by means of discovery. Cognitive theory is concerned with the maturational influences bearing on learning and how material is understood by students, individual's aptitudes and capacity to learn, and methods of doing so.

The brain was considered to have an internal knowledge structure (schema), new information is compared to existing schema, resulting in schema being combined, enlarged or changed to accommodate novel data. First entering a sensory register, the information is processed in the short-term memory before being archived in long-term memory for possible future use.

According to Hartley: "Learning results from inferences, expectations and making connections. Instead of acquiring habits, learners acquire plans and strategies, and prior knowledge is important" (1998, p.18). He notes that instruction should be: (a) organised well and clearly structured; (b) perceptual features of tasks are important; (c) differences between individuals are important as they affect learning; and (d) cognitive feedback provides learners with information about success or failure in respect of a specific task.

Constructivist

This orientation has roots in the cognitivist approach. Critical to the internal mental learning process is cognitive conflict. Current or past knowledge, social interactions, and motivation affect the way in which learners construct new ideas. Teaching should relate to the learner's prior knowledge rather than a rigid curriculum, providing a more open-ended experience. Outcomes may not be so easily measured, however, and may be different for individual learners.

Dewey (1933) advocates that what is learned should have meaningful relevance to the society and world around the individual, a lived experience. Education should be grounded in the learner's needs and stage of cognitive development as they progress through a maturational process (Bruner, 1960). Vygotsky (1978) argues that the community and people around the learner are important in affecting the way in which the world is perceived. The

pattern and rate of development of cognitive development are determined by the tools available for this process, e.g. culture, language, significant adults.

Humanist

This approach stresses the human self's potential for growth/development. The reductionist approach of individuals as objects was replaced with a reaffirmation of subjectivity and affectiveness; key issues are choice, personal freedom, feelings and motivations. The approach is much more of a prescriptive one compared to the descriptive ones outlined above. One of the key constructs in this approach is Maslow's (1970) "hierarchy of motivation". One moves from the lowest level (physiological needs) progressively to the highest (self-actualisation) as the requirements of each successive level are met. This is not to imply that all individuals will reach the highest level, but seek to attain the highest they can. Thus, learning is a type of self-actualisation, and can lead to psychological well-being, a sense of achievement and controlled impulses.

Rogers (1983) favoured this notion of engaging logic and intuition, intellect and emotions, and saw it as making individuals complete and fulfilled. Central to experiential or significant learning are: (a) quality of personal involvement; (b) self-initiated; (c) pervasive; (d) evaluation by the learner; and (e) meaning. The educator in this context is someone who empowers individuals, acts as a facilitator, loses dominance as a teacher.

Social/situational

Social learning theory argues that individuals learning by watching others (Merriam & Caffarella, 1991, p. 134); by definition this activity occurs in a social setting. Observation permits individuals to witness the consequences of another's actions (behaviours); it is possible to formulate an appreciation of the results that may flow from following one course of action compared to another. This 'coded' information serves as a guide for action on later occasions (Bandura, 1977); then individuals can compare their behaviour against such models, rehearsing how it might play out in different scenarios (Hergenhahn, 1988).

An extension of this model – 'situated learning' - was elaborated by Lave & Wenger (1991). They sought to place learning within the arena of social relationships rather than seeing it as the acquisition of certain types of knowledge. Learners participate in contexts that have structural frameworks, communities of practice, starting to learn at the periphery and moving to the centre as they become competent. This involves the 'whole person acting in the world' in 'an evolving, continuously renewed set of relations' (Lave & Wenger, 1991, pp. 49-50). Smith (1999) suggests that situated learning provides three important aspects for practice: (a) the relationships between individuals provide the learning context; (b) the educator's role is to enable participation in communities of practice; and (c) knowledge and activity are intrinsically linked.

Learning styles

Individuals learn in a variety of ways (Beard & Hartley, 1984), having leanings for particular types of information and methods of using that data to learn/approach a task. There are several ways of looking at learning styles, some of which overlap, but there is no single coherent approach. In a comprehensive paper, Cassidy (2004) classifies 23 different models of learning styles within a taxonomy based on categories proposed by other researchers, as follows: Curry (1987) – instructional preference, social interaction, information processing, cognitive personality; Riding & Cheema (1991) – wholist – analytic; Rayner & Riding (1997) – personality centred, cognitive centred, learning centred.

Curry (1987) uses an onion as a metaphor for a layered model of a learning/cognitive style. The outer layer is 'instructional preference' and links to the external learning environment; it is the most easily observed and open to influence, thus rendering it most unstable for measurement. Beneath this lies 'social interaction' (preference for/avoidance thereof), followed by the 'information processing style' or intellectual approach to processing and assimilating information, and is more amenable to measurement. Processing is internalised and is not as directly controlled by environmental influences, but can be modified through learning and teaching strategies. Underlying all of these is the core 'cognitive personality style' or inherent personality traits, considered by Riding & Cheema (1991, p. 195) as a "relatively permanent personality dimension … apparent only when an individual's behaviour is observed across many different learning situations". This aspect is key to the way in which individuals approach learning, and may relate to previous experiences, gender, etc. and is very difficult to alter.

Riding & Cheema (1991) identified two fundamental dimensions of learning style: information can be processed either as a whole (wholist) or as elements (analytic). Wholists can be seen as "inductive, expansive, unconstrained, divergent, informal, diffusive and creative"; whilst analytics are "deductive, rigorous, constrained, undivergent, formal, critical and synthetic" (Nickerson *et al.*, 1985). Information can be represented as words (verbalisers) or as images (visualisers). These two dimensions are independent, not contingent on each other.

Rayner & Riding (1997) suggest three approaches to learning; personality-centred is an important factor. Individual differences in cognitive and perceptual functioning are the focus of cognitive-centred approaches. Greater interest in the way in which learning in an educational setting impacts style, together with new concepts/constructs concerned with learning, is the basis for the third category. Within this are three models: (a) process, such as Kolb's (1984) experiential learning model, related to perception and information processing; (b) preference – concerned with the learning situation/environment and methods; and (c) cognitive skills being applied to a learning situation, focusing on field-dependency, memory and model of perception.

Some of the main models of learning styles are now briefly examined. Bloom (1956) suggested taxonomy of three domains: cognitive (knowledge and intellectual skills); psychomotor (mechanical/physical skills); and affective (attitudes and feelings). Each of these domains has a hierarchy of learning objectives involving progressive complexity/intricacy. Progression through the cognitive domain comprises: knowledge, comprehension, application, analysis, synthesis and evaluation. The levels in respect of psychomotor 'competencies' are: imitation, manipulation, precision, articulation and naturalisation. The observable behaviour underlying the affective domain comprises: receiving, responding, valuing, organising and characterising.

Biggs & Collis (1982) proposed that learning could be examined by looking at the Structure of Observed Learning Outcomes (SOLO). Like Bloom's, this model is hierarchical with each of the five levels of understanding building on the earlier one(s). At the pre-structural level there is an assumption of no prior understanding/knowledge. Learners at the next stage have understanding founded on a single relevant (unistructural) feature of a concept, idea or topic. At the next level several relevant (multistructural) features are understood but are not connected until the next level, when the relational associations between them facilitate integration into a coherent whole. Beyond this, ideas can be conceptualised in a more abstract way and then applied to other situations. The SOLO approach means that 'deep' learning can be encouraged starting with no prior knowledge, building up sequentially to whatever level the learner wants to achieve. The first three levels are regarded as 'surface' learning, comprising increased knowledge, memorising, and acquiring frameworks/methods; the final two are seen as 'deep' learning (Biggs, 1987). A surface approach is often used to acquire knowledge to perform a specific task, and information is gained by reproduction.

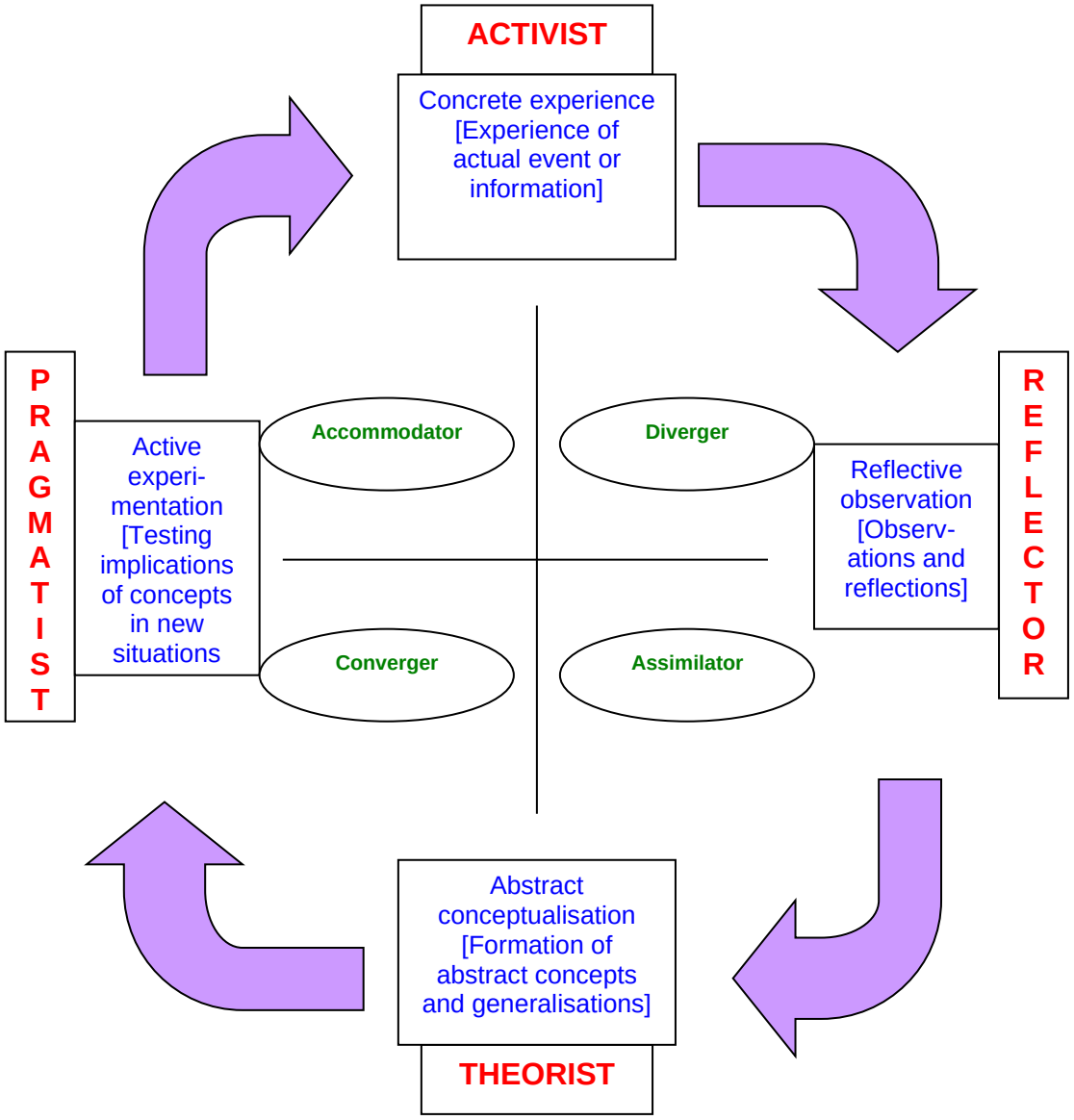
Material is only retained superficially and fails to provide understanding, and the long-term retention of information. Deep learners are interested in learning *per se*, seeking to comprehend concepts by transforming information.

Fleming & Mills (1992) identify four learning styles: Visual, Aural, Read/write, Kinaesthetic (VARK); or seeing, hearing, read/writing, practical. They suggest that the VARK approach can support students with learning difficulties, develop strategies that enhance learning effectiveness, and enable educators to get alongside their students. The instrument has been criticised since less than 60% of users believe their assessment reflects reality. A similar approach developed by Felder & Silverman (1988) looked at student preferences in respect of the following features/dimensions: (a) type of information perceived preferentially – external/sensory (touch, sight, sound) or internal/intuitive (hunches, insights); (b) most effective sensory channel for external information to be perceived – aural or visual; (c) information processing – active or reflective; and (d) understanding progress – sequentially (step by step) or globally (holistically, in large jumps).

Lewin (1935) advanced a cyclical notion of learning in which experience is followed by observation, reflection, and the testing of ideas. (Kolb (1984) developed this into the "experiential learning cycle" (see Figure 1). The testing of concepts in new situations leads to more concrete experience; thus ideas are not fixed and can evolve. Wolfe & Kolb (1984) suggested that there is a dominant phase in this cycle which appeals more to students when they are learning. For example, the leading learning abilities for a convergent learning style are abstract conceptualisation and active experimentation. Kolb (1984) developed a 12-item Learning Style Inventory (LSI) which asked people directly how they learned. Although the LSI is widely used in educational circles, concerns have been raised about its reliability and validity (Cassidy, 2004).

A different tack was taken by Honey & Mumford (1986) with their Learning Styles Questionnaire (LSQ) designed to elicit indirect information from a more open and reflective 80-term instrument. It aims to help identify preferred learning styles, so as to enable individuals to better select learning opportunities that suit their style(s), redress any under-employed styles, and be more effective at learning from experience. Once an individual knows their score they can decide how to take the learning experience forward, identifying opportunities, etc. Since learning styles are 'acquired' rather than being fixed personality traits, they can be modified either through circumstances or by a learner's deliberate decision. Honey & Mumford (1986) follow the cyclical process advanced by Kolb (1984), seeing each element as interdependent. They identify four learning styles: Activist, Reflector, Theorist, Pragmatist; and provide characteristics of these styles. These can be aligned with Kolb's (1984) approach, as shown in Figure 1. Concerns have been raised about the LSQ's psychometric qualities. Duff & Duffy (2002) failed to find evidence of either the learning styles and bipolar dimensions of the instrument. Furthermore, the levels of internal consistency for the four style sub-scales were only moderate.

Figure 1: Experiential Learning Cycle and Styles, after Kolb (1984), Wolfe and Kolb (1984), and Honey and Mumford 1986)



Methods

This section outlines a case-study illustrating activities designed by the author to provide students at a UK Medical School with a range of information and experiences about the context in which their research project will be undertaken, so as to assist in them getting a wide and deeper understanding of the context(s) and dimensions within which the phenomenon under examination is present.

This one- or two- day session comprises several linked activities which, in combination, provide a comprehensive introduction and contextualisation to researching substance-related mortality. Activities include: provision of oral briefing and written materials prior to event;

orientation session on the day; review of students' research proposals; observation of inquests conducted by coroners followed by group discussion (and with coroner if available); demonstration and 'hands-on' experience of examining court records and data extraction; feedback on processes and discussion of how research proposals and data collection instruments might need refining (Figure 2). No students had any prior knowledge of the coronial system, and only a basic awareness of the mortality surveillance programme.

Figure 2: Contextualising research project – observation of coroners' inquests and examination of coronial records

Case-study

The first activity is to meet with the students at the coroner's court in a private room (usually the Jury Room) so that we do not interfere with the running of the court and other coronial activities and can talk freely about issues associated with mortality which might upset members of the public attending the court. During this session, the author reminds the students of the unique role of coroners in providing information on mortality studies and what their formal role(s) are. Procedural formalities and professional behaviour are outlined, as well as the reasons for following these protocols. The students then briefly outline their own research aims and how they think they are going to use the coronial records.

Visits to coroners' courts are arranged for days when inquests are being held. Prior to observing the inquests, students are briefly familiarised with the court layout and officers of the court. Several inquests are normally observed. During the period when the coroner retires to consider the verdict, the students and author go to the Jury Room to discuss the features of the individual case and what the verdict might be and why. The author outlines what documents provide different sources of information relevant to the case. We then return to the court room to hear the verdict and the reasons given by the coroner for that particular conclusion.

Following the inquests, we meet as a seminar group to discuss the cases observed. If possible, a brief meeting is arranged with the coroner to discuss in slightly more detail the factors taken into account in coming to his/her conclusion.

The next activity is an examination of the coronial records. Those primarily looked at are those involving inquests, although non-inquest papers are also briefly discussed and examined. Initially, the author goes through several case records extracting information to complete the Programme's standard data collection form (Corkery *et al*., 2014), explaining what documents particular data items are expected to be in and how to interpret the information available. Each student in turn has a go, and also tries out any additional data collection instrument being used for their own research project. Group discussions and individual one-to-ones can then provide constructive feedback, based on which revisions to the research protocols may be necessary.

These activities are supported by materials written by the author based on the research undertaken by the Programme he managed and now advises at St George's, University of London, as well as materials produced by individual coroners' courts, and materials available on websites for the Ministry of Justice (responsible for coroners) https://www.gov.uk/government/publications/guide-to-coroner-services-and-coroner-investigations-a-short-guide and the Coroners' Society http://www.coronersociety.org.uk/.

A retrospective review of the author's approach was conducted as part of the course of study on which this paper is based, without the benefit of theories and instruments relating to teaching and learning styles. One of the main instruments (Honey & Mumford, 1986) used for self-ascertainment of learning styles was applied to the author to establish his preferred learning styles; this was undertaken online by the author prior to that assignment.

A retrospective qualitative survey of students' experiences of the case-study was undertaken specifically for this assignment, as well as asking about how they liked to learn (see Appendix for the survey instrument and responses). It was a sample of 5/14 students (4 Italian, 1 British) who had undertaken these activities over the previous 7 years. It was an opportunistic sample as the author was still in direct contact them. They were contacted and the instrument and responses delivered by e-mail. The instrument consisted of 24 questions grouped into 8 blocks, designed to elicit objective feedback about different aspects of the activities undertaken.

Results

Retrospective review

This combination of approaches has developed over a number of years, originally based on the author's developmental needs when he commenced assisting voluntarily with the Programme in terms of data collection prior to becoming Programme Manager 7 years before. When approached to supervise third-year undergraduate medical and bio-medical students who wished to use coronial records as a source of information for their Special Study Module, he considered what activities had best served his own learning needs when he wanted to gain a deeper understanding of the processes shaping the ways in which information is generated and presented in this field. The aspects of observing actual inquests, an examination of coronial records guided by someone experienced in data extraction from these documents, and then doing it oneself under supervision, were the key core elements. To these he added the opportunity to discuss cases after observing them, and debriefs from coroners when this was possible. Further support in terms of documentation and on-line resources supplement and complement these activities.

Honey & Mumford results

The LSQ results for the author are given in Table 2. They reveal the author to have very strong preferences for both the Reflector and Theorist approaches, a moderate to strong score for the Pragmatist dimension, but a very low score for the Activist dimension. The rankings (percentiles) given are based on a comparison with all respondents who have taken the exercise online; they remain similar when compared to senior male managers in the UK in the author's age-group.

Table 2: Author's LSQ scores

Style	Raw score	Percentile		Strength	Preference
		All respondents *(n= 44889)*	Matched group *(n = 76)*		
Activist	3	4	4	Very low	Under-developed
Reflector	20	100	100	Very strong	Preference
Theorist	18	98	100	Very strong	Preference
Pragmatist	14	67	64	Moderate to strong	

Feedback from survey

Not all questions attracted individual responses, but generic answers were provided for some of the question blocks. The main findings are summarised in Table 3.

Table 3: Main findings from survey

Element	Findings
Pre-visit preparation	The verbal briefing and provision of reading materials prior to the visit was thought by all students to have been the best way to prepare; no additional methods were suggested.
Inquest observation	Four respondents observed inquests and were able to follow proceedings, although one had minor language issues. All 4 respondents felt the detailed briefing prior to the visit helped them understand the process, procedures and logic applied. One noted that this was useful to develop a critical view necessary for the data-entry process and in writing the dissertation. The provision of written materials was also useful. One student would have liked to observe more inquests.
Examination of court records	All students were helped by the author going through court records explaining where different types of information are found. This helped familiarise them with the records, what information was available for inquests, and how it was used by the coroner. There were no suggestions for improvement.
Data collection form filling	The practical demonstration by the author of completing forms helped students' understanding in several ways: location of information; process and issues; information retention. Two students would have liked more practice.
Small group work	Working in small groups helped students preparing their own research, but for one respondent this was felt more to serve the needs of the Programme as the data being extracted were not available for her dissertation. Students were engaged by looking at a range of cases, and getting clinical insights that are unavailable using other approaches. Suggestions for doing things differently were: (a) reducing the level of detail given by the author; (b) more group discussion on topics of specific research interests.
Preparation for research	For three students who looked at court records, the experience helped them understand what information is available, how it is gathered and collated, how it can be extracted, used for decision-making, inferences possible. Amongst the most useful aspects were: (a) following the complete process; (b) being able to relate clinical information to circumstances of death. More information on locus of death was suggested. One student felt they did not need to visit the coroner to write their dissertation or to think about their research proposal, as the information that they targeted was already given in the coroner's forms. This respondent thought a review of the cases extracted for their dissertation would have been helpful.
Feedback	Most helpful aspects: (a) detailed comments enabled student to guide their studies; (b) methodology, revision of research proposal, selection criteria and giving it a logical and fluent flow; (c) how to analyse and use data. One student felt that closer supervision of topics related to students' field of interest and another student thought that prompter responses from the author (based at another institution) would have been beneficial.

Four respondents indicated they used a variety of learning techniques. Three students thought that the methods used in the case-study were suitable. Suggestions for further

improvement included: personal discussions with the coroner; greater access to medical/clinical records; more time spent extracting data from court records; and more reading material. There appears to have been a close congruity been the preferred learning styles/ methods of the respondents and those used in the case-study (Table 4). Only minor adjustments to some activities were suggested.

Table 4: Match-up between methods/approaches used in the case-study and students' preferred way(s) of learning

Respondent	Comment re learning style(s)
1	I think being given the written material and going through that prior to going to the coroner's courts was an ideal way for me to learn.
2	I think they match up perfectly, maybe I would prefer some more concrete example than more technical details but all in all it was effective and useful.
3	The method used matched up completely with my own approach and it was more satisfying than the methods I have experienced in previous research projects.
4	The models we used were similar to my study model within the limits of [re]search rules.
5	Taking part to the whole process of holding an inquest perfectly matched with my preferred way of learning, as it gave the chance to touch with hand what was going on.

Discussion and conclusions

There is no overall paradigm about how learning occurs. The examples of learning theories examined here often share common elements, or place an emphasis on some aspects compared to other models; similarly with learning styles. Despite this plethora of approaches, it is possible to derive some principal elements.

Learning theories and styles relate closely to each other. Of particular importance is the notion of a cyclical learning process, for example, as illustrated by Wolfe & Kolb (1984). The practical experience of an event or activity can lead to thinking about it and other events, deriving ideas about patterns, associations, etc. This insight can then be applied to new situations/experiences and their results used to inform future actions. This approach can also absorb some elements of non-cyclical approaches where learning is built up one stage at a time.

This cyclical process is evident in the present case. Students prepared research proposals based on reading, discussion, etc. setting out the information and other resources required to conduct research. They were then exposed to concrete examples (inquest observation, data extraction from court records, etc). This experience enabled them to understand the process of information generation, and detailed knowledge of information availability and limitations. Reflecting on these findings in a small group and individually with the author helped refine the research proposals before proceeding to identify relevant cases to analyse.

It is difficult to categorise precisely this cluster of activities. The learning is project-based with small-group teaching with the author acting as facilitator. In some respects, some of its elements constitute a 'live' simulation where real-life 'players' use genuine systems in a real environment. It could be considered to be covered by Quinn's (2000) definition of simulation as "imitation of some facet of life… It aims to put students in a position where they can experience some aspect of real life by becoming involved in activities that are closely related to it". Students learn in a 'hands-on' experiential learning activity, gained by means of experience and involvement that are determined by the individuals themselves. However, these elements are accompanied by received teaching/training, e.g. reading about the topic,

listening, and observation, as well as small-group seminars. These activities thus encompass the whole gamut of learning by 'listening' and 'doing', to use Shank's (1997) terms. The activities described in this case-study reflect the educator's desire to contextualise what has been taught through traditional seminar and received teaching approaches so that students were able to apply knowledge to real situations by 'doing', thereby enhancing their understanding of cause and effect (Gilgeous & D'Cruz, 1996).

The students' feedback suggests they have a broadly similar approach to learning as the author, in respect of using a variety of methods. It appears that the range of teaching activities used here were appropriate for delivering the learning objectives envisaged by the author. Different strategies/techniques can be employed appropriate to the stage of learning towards a particular goal. In this case-study a range of approaches was used, but others could have been employed to advantage. More emphasis could have been given to specific aspects for individual students to fit with their own perceived learning styles. The methods used in the case-study were appropriate for this type of 'medical education' comprising learning by observation and doing, as part of the experiential component. Feedback from the educator and peers, as well as personal reflection on the activities undertaken and how they have learned – 'reflection on action' (Schön, 1987) helped the students to develop as "critical reflective learners and practitioners" (Brockbank & McGill, 2000).

Not only did students investigate the topic set by the educator, they also formulated their own research topics and undertook research that has led to new and useful knowledge in the form of dissertations and academic papers. Deeper learning and understanding were also facilitated by this work (Marton & Säljö, 1976). The amount of knowledge gained from practical experiences is positively related to strategic and deep learning styles as used in these activities (McManus *et al*., 1988).

The sequence of activities designed by the author in this case-study match up with the cyclical approach to experiential learning expounded by Kolb (1984) and others. The process was envisaged without the benefit of prior theoretical knowledge; thereby suggesting that the experiential model adopted by many pedagogical researchers is intuitive, based on experience and reflection of previous learning activities – itself evidence of its practical application.

The LSQ confirmed what the author already knew to be his preferred learning styles. The low 'Activist' score suggests some development of this dimension can take place. Using the case-study as an example, this might mean being more active in ascertaining students preferred learning style(s) in advance of designing activities, and seeking more feedback about delivery during the activities themselves. The use of the questionnaire used for this assignment has helped the respondents identify their preferred learning styles and will assist them choose future activities that will benefit them more. This is in line with the aim of Honey & Mumford (1986) in making students more effective in learning. No one method of learning will suit all students, but deploying a range of methods can maximise the facilitation of learning.

Limitations

Ideally feedback would have been sought from all students who have undertaken these activities. However, due to lack of time before submission of this assignment and difficulties in tracking down individuals up to 7 years later was problematic. The number of respondents (5; 35.7%) limits the generalisability of the findings. However, the high degree of consensus means the conclusions are suggestive of student experiences generally.

Memory recall may have affected the responses of two students who undertook these activities 3 years before the survey, but they are more likely to be more considered answers. The three other students underwent this training within 3 months of the survey.

Whilst this case-study relates to the needs of biomedical and medical undergraduates as well as postgraduate psychology and medical students, the findings are likely to be applicable to students in other disciplines. The real-life 'simulation' model described here could also be adapted for other settings, e.g. studies of suicide, occupational health and safety audits, epidemiology of industrial and communicable diseases. This study was small-scale in nature using an opportunistic sample, and should be regarded as providing suggestive evidence for the findings reported. However, the principles outlined above could be applied in other settings to provide more data on this aspect of pedagogy and thereby develop theory in this domain.

Whilst a decade or more may have elapsed since these activities were undertaken, the principles set out above still have practical value today.

Acknowledgements

The author is grateful to Her Majesty's Coroners for Western London and their staff for allowing access to the court and its records. Thanks are also extended to the 5 former students who kindly provided feedback on their experiences to the author.

This paper is based on an assignment undertaken as part of the author's Post-graduate Certificate in Learning & Teaching in Higher Education at the University of Hertfordshire in 2012. The course team are thanked for their encouragement and support.

References

Bandura A. 1977. *Social learning theory*. Prentice-Hall Inc.: Englewood Cliffs, NJ.

Beard RM, Hartley J. 1984. *Teaching and learning in Higher Education*, 4th ed. Athenaeum Press: Newcastle-upon-Tyne.

Biggs J. 1987. *Student approaches to learning and studying*. Australian Council for Educational Research: Hawthorn, Vict.

Biggs JB, Collis K F. 1982. *Evaluating the quality of learning: the SOLO taxonomy*. Academic Press: New York.

Bloom BS. (ed.). 1956. *Taxonomy of Educational Objectives, the classification of educational goals – Handbook I: Cognitive Domain*. McKay: New York.

Brockbank A, McGill I. 2000. *Facilitating reflective learning in Higher Education*. The Society for Research into Higher Education & Open University Press: Buckingham.

Bruner J. 1960. *The Process of Education*. Harvard University Press: Cambridge, Mass.

Cassidy S. 2004. *Learning styles: an overview of theories, models, and measures*. Educational Psychology, 24(4): 419-444. https://doi.org/10.1080/0144341042000228834

Corkery J, Claridge H, Loi B, Goodair C, Schifano F. 2014. *Drug-related deaths in the UK: Annual Report 2013. Drug-related deaths reported by Coroners in England, Wales, Northern Ireland, Guernsey, Jersey and the Isle of Man; Police forces in Scotland; & the Northern Ireland Statistics and Research Agency – Annual Report January-December 2012*. 12 February. London: International Centre for Drug Policy, St George's University of London. Retrieved April 10, 2015. Available from: https://www.sgul.ac.uk/about/our-institutes/population-health/documents/NPSAD-Drug-Related-Deaths-January-December-2012.pdf
Accessed 30 December 2020

Curry L. 1987. *Integrating concepts of cognitive or learning style: A review with attention to psychometric standards*. Canadian College of Health Service Executives: Ottawa, ON.

Dewey J. 1933. *How we think*. Heath: New York.

Duff A, Duffy T. 2002. Psychometric properties of Honey and Mumford's Learning Styles Questionnaire, *Personality and Individual Differences*. 33(1): 147-163. https://doi.org/10.1016/S0191-8869(01)00141-6

Felder RM, Silverman LK. 1988. Learning and teaching styles in engineering education. *Engineering Education*. 78(7): 674–681.

Fleming ND, Mills C. 1992. Not Another Inventory, Rather a Catalyst for Reflection. In: To Improve the Academy, Vol. 11 *Resources for faculty, instructional, and organizational development*. Wulff DH, Nyquist JD (eds.). New Forums Press: Stillwater, OK. pp. 137-155.

Gilgeous V, D'Cruz M. 1996. A study of business and management games. *Management Development Review*. 9(1): 32-39. https://doi.org/10.1108/09622519610181757

Hartley J. 1998. *Learning and studying. A research perspective*. Routledge: London.

Hergenhahn BB. 1988. *An Introduction to the Theories of Learning*. Prentice-Hall Inc.: Englewood Cliffs, NJ.

Honey P, Mumford A. 1986. *A Manual of Learning Styles*. Peter Honey: Maidenhead, Berks.

Keesee GS. 2011. Learning theories. Teaching and Learning Resources. Available at: http://teachinglearningresources.pbworks.com/w/page/19919565/Learning%20Theories.
Accessed 30 December 2020

Kolb DA. 1984. *Experiential learning: experience as the source of learning and development*. Prentice-Hall Inc.: Englewood Cliffs, NJ.

Lave J, Wenger E. 1991. *Situated learning. Legitimate peripheral participation*. University of Cambridge Press: Cambridge.

Lewin K. 1935. *A dynamic theory of personality*. McGraw-Hill: New York.

Marton F, Säljö R. 1976. On Qualitative Differences in Learning – 1: Outcome and Process. *British Journal of Educational Psychology*. 46(1): 4-11. https://doi.org/10.1111/j.2044-8279.1976.tb02980.x

Maslow A. 1970. *Motivation and personality*, 2nd ed. Harper & Row: New York.

McManus IC, Richards P, Winder BC, Spraston KA. 1998. Clinical experience, performance in final examinations, and learning style in medical students: prospective study. *BMJ*, 316: 345-350.
https://doi.org/10.1136/bmj.316.7128.345

Merriam SB, Caffarella RS. 1999. *Learning in adulthood: a comprehensive guide*. Jossey-Bass Publishers: San Francisco, CA.

Nickerson R, Perkin D, Smith E. 1985. *The teaching of thinking*. Erlbaum: Hillsdale, NJ.

Pavlov IP. 1927. *Conditioned Reflexes: An Investigation of the Physiological Activity of the Cerebral Cortex*. (translated by G.V. Anrep). Oxford University Press: London.

Piaget J. 1926. *The child's conception of the world*. Routledge & Kegan Paul: London.

Quinn F. 2000. *The principles and practice of nurse education*. 4th ed. Chapman & Hall: London.

Rayner S, Riding R. 1997. Towards a categorisation of cognitive styles and learning styles. *Educational Psychology*. 17(1-2): 5-27.
https://doi.org/10.1080/0144341970170101

Riding RJ, Cheema I. 1991. Cognitive styles: an overview and integration, *Educational Psychology*. 11(3-4): 193-215.
https://doi.org/10.1080/0144341910110301

Rogers CR. 1983. Freedom to Learn for the 80's. Merrill: Columbus, OH.

Schön DA. 1987. *Educating the Reflective Practitioner: towards a new design for teaching and learning in the professions*. Jossey-Bass Publishers: San Francisco.

Shank R. 1997. *Virtual learning: A revolutionary approach to building a highly skilled workforce*. McGraw-Hill: New York.

Skinner BF. 1973. *Beyond freedom and dignity*. Penguin: Harmondsworth, Middx.

Smith MK. 1999. '*The social/situational orientation to learning'*, The encylopedia of informal education. Available at: www.infed.org/biblio/learning-social.htm.
Accessed 30 December 2020

Smith MK. (1999-2020). '*Learning theory*', The encyclopedia of pedagogy and informal education. Available at: https://infed.org/learning-theory-models-product-and-process/
Accessed 30 December 2020

Thorndike EL. 1913. *Educational psychology: Vol. 2. The psychology of learning*. Teacher's College Press: New York.

Vygotsky LS. 1978. *Mind in Society*. Harvard University Press: Cambridge, MA.

Watson JB. 1913. Psychology as the behaviourist views it. *Psychological Review*. 20: 158-177.

Wolfe DM, Kolb DA. 1984. Career development, personal growth and experiential learning. In: *Organisational Psychology: Readings on human behaviour*, 4th ed. Kolb DA, Rubin IM, McIntyre JM (eds.). Prentice-Hall Inc.: Englewood Cliffs, NJ. pp. 124-152.

Appendix – Qualitative Survey questions and responses

Covering email

Coroner feedback

I would like you, if you can, think back to when we visited the coroner's court at Fulham as part of your induction/preparation for helping the National Programme on Substance Abuse Deaths (np-SAD) and getting information for your dissertations/papers.

I am following a course at the University of Hertfordshire to become a qualified teacher. For my current assignment I am reflecting on (thinking about) my teaching style (way of teaching) and how I approached your learning about the coroner's court, and the information that np-SAD collects and uses.

It would help me greatly if you could if you could try and answer the following questions and send me your replies in the next few days, please. Please be as honest and critical as possible because I need to understand how I could have improved your learning experience. Many thanks for your help.

Questions

Before we went to court, I spoke to you about the activities we would undertake. I also gave you printed materials about the court, how it works, and what the coroner tries to find out about a death.
Q1 – Was this the best way(s) to prepare you for the visit?
Q2 - Would you have preferred other way(s) of doing this?
Q3 – If yes, what would have helped?

We sat in the court and observed some inquest cases.
Q4 - Were you able to follow/understand what happened?
Q5 – If so, what helped you in the process?
Q6 – What else could have been done to help?

When we looked at the coroner's inquest records, I went through some cases explaining what sorts of information were in the files and where they could be found.
Q7 – Was this helpful for your understanding?
Q8 – If yes, why was it helpful?
Q9 – If no, what else could have been helpful?

I then went through the task of completing some np-SAD forms, explaining what I was doing, and then got each of you to do the same thing describing what you were doing.
Q10 – How did these activities help your understanding and why?
Q11 – Could we have done anything else to help here?

You then worked in a small group to extract information for the np-SAD report, also looking out for cases that might be relevant for your own dissertation/academic paper, and discussing individual cases.
Q12 – Which of these aspects/tasks was most useful and why?
Q13 – Could we have done anything differently?
Q14 – If so, what would have helped you and why?

The visit to the coroner's was aimed at helping in the preparation of your ideas/proposals for your dissertation/paper.
Q15 - In what ways did the visit help in this process?
Q16 - What aspects were particularly helpful?
Q17 – What aspects were unhelpful?
Q18 – What else could have been done to help?

Both during our visit to the coroner's court, and when reviewing your research proposals
Q19 – What aspects of the feedback did you find most helpful?

Q20 – What aspects were least helpful?
Q21 – How could this process have been improved for you?

Thinking about how you learn
Q22 – How do you usually like to learn?
Q23 – Ideally, what approaches would you have used to learn about the coroner's court, its records and the np-SAD data collection process?
Q24 – How did the methods/approaches used in the visits and other activities match up with your own preferred way(s) of learning?

Answers

[Note: These have not been edited in any way.]

Respondent 1

Q1-3: I felt prepared for the visit by just having the printed material.
Q4-6: From my memory, I followed the case very easily. Having a little understanding of the background, through chatting to John, the forms, and the written material John provided was very useful in helping my understanding.
Q7-9: Yes, the records can be very big so it was helpful that you went through and pointed out where to find the information, however it was not always where it should be. But for a starting point it was good to point it out, and it helped me become familiar with the records.
Q10-11: This was pretty straight forward, by undertaking this task it helped me improve my skills in finding information in the records.
Q12-14: I did not work in a small group with this task, but I worked with you on this throughout the year. I think the information I learnt from these discussions were very useful. I learnt how to look out for different cases that could be of interest, I learnt how to research into these different cases, and you kept me interested in the subject matter. I felt that during these discussions I learnt the most about np-SAD, rather than when just data inputting. However I would recommend that you keep in mind the audience you are talking to, and not go into too much detail about the subject.....this is just because you are so enthusiastic about your subject.
Q15-8: The visit helped me understand the process of how the information is obtained and put together, from the police reports to the autopsy etc. There was not anything unhelpful about it.
Q19-21: The comments back were very detailed which enabled me to see where I should steer myself, especially the comment back about the time line. However, sometimes the comments were too detailed and I felt that some comments may have been unnecessary. This could have been my impatience too since I know that you are very thorough and give very useful feedback.
Q22-4: I usually like to learn at my own pace, taking written material back with me to read through at my own time. I don't mind interactive learning too, as long as I have some material which I can read up on before-hand so that I am prepared a little. I think being given the written material and going through that prior to going to the coroner's courts was an ideal way for me to learn.

Respondent 2

Q1 Yes, it was, because listening to you and reading the material we were able to know what we would have espected and to what kind of procedures and informations we have to pay more or less attention.
Q2 No, I wouldn't.
Q4 Yes, I was.
Q5 The thing that helped me was the fact that you had explained to us, before going there, what was the structure and the various stages of the trial.
Q6 Maybe some written material with some example of the extract of previous trials.
Q7 Yes, it was necessary.
Q8 Because the material we were looking through was so vast and complex that we needed some indication to where we have to orientate our attention giving more notice to some document instead of others.
Q10 These activities helped me because I needed to understand which information were required to fill the form and I could observe how and where you could find them in a practical way.
Q11 I don't think so.

Q12 I think that these work was more useful for the np-SAD report because for our dissertations we had a limit of the period of time (from 1997 to 2009), so we couldn't use the data of the cases that belong to 2010 and 2011.
Q13 I don't think so because it was a matter of publishing rights.
Q15 It helped clarifying the way the coroners classifying the cases and take decision, how they collected information and to clarify which process they use to extract them and put them in the form.
Q16 I think that the most helpful aspect was to follow every single step from the trial in the court to the filled form.
Q17 I don't know…
Q19 During the visit to the court the most helpful thing was to know what to expect and which procedures they will follow. About reviewing my research proposal was discussing together my doubts and my ideas about my dissertation, receiving your suggestions and advice about some aspect of the argument of my thesis that I hadn't considered before, helping me to organize in a logical and fluent way the discussion, teaching me how to do some statistical analysis and how to use the data.
Q22 I like to learn by direct lessons with the teacher by receiving information and exchanging opinions constantly and discussing freely my doubts. I also like to have some written material as a outline and some concrete examples.
Q23 I think the one we used was fine.
Q24 I think they match up perfectly, maybe I would prefer some more concrete example than more technical details but all in all it was effective and useful.

Respondent 3

Q1 Yes
Q2 No
Q4 Yes, I were with some limitation due to the language.
Q5 Your previous explanation of what we would have seen in the court.
Q6 The preparation was exhaustive but it could be useful to see more inquests to better understand that process.
Q7 Yes
Q8 Because understanding which information are included in the coroner's inquests, and the sources that the coroner uses during the inquest, I could also catch the method he applied to pass the verdict and other inferences/evidences.
Q10 They helped to understand the fundamental structure of an inquest; furthermore, by filling out the form I better focused and stored these items.
Q11 I don't think so.
Q12 The correlation between clinical information and the circumstances of the decease, because it provided aspects that cannot be easily extrapolated from the "usual" clinical practice but at the same time those information are very useful for that (for example preventing suicide or accident).
Q13-Q14 Just to be as critical as possible, you could have promoted more group sessions discussing on topics of specific interest (in my case clinical issues).
Q15 To understand which information were available in order to prepare the dissertation and what other could have been inferred subsequently.
Q16 The circumstances of death and clinical information (such as psychiatric diagnoses, treatments etc).
Q17 The information on the different areas in which the deaths occurred.
Q19 The aspects concerning the methodology of the study.
Q20 None in particular.
Q21 Focusing on the supervision on the topics of the specific field of interest (in my case clinical issues).
Q22 Through an active participation in a process (trial learning), integrating with a thereabout reading in a second time.
Q23 The one you proposed, but with a greater access to clinical documents such as medical records where applicable.
Q24 The method used matched up completely with my own approach and it was more satisfying than the methods I have experienced in previous research projects.

Respondent 4

Q1 it was a very good method;
Q4 you are unable to follow even if slowly because it was my first time;
Q5 I understand becuose the process was explained to me in a clear and understandable everything had a logical and I was explained with practical examples;
Q6 At the moment I think this it was enough to understand what that I needed;
Q7 It was useful;
Q8 It was useful becouse through every piece of information I could understand the case recorded as a whole any information helped me to understand the various aspects of the case, particular style of life, a subject of study for me;
Q10 Complete some form nps helped me to improve the understanding of the issues practice with the computer program and to read, study and think carefully about the individual case information;
Q11 At the moment I think this it was enough to understand what that I needed perhaps take more practical;
Q12 Many aspects have been useful for my studies, such as data lifestyle cases, on the relationship they had with other people, their culture the use or non of medicines, age and other;
Q13 At the moment I think this it was enough to understand;
Q15 Unfortunately I have not done the visit with the coroner live;
Q22 Usually I like to learn through a lecture, through of written manuals to be read in itinere I take notes from the explanations by the tutor;
Q 23 I'd like to do some interviews personally to coroner and the affects of the cases studied;
Q24 The models we used were similar to my study model within the limits of [re]search rules;

Respondent 5

Q1 Yes
Q2 No
Q4 Yes
Q5 It enabled me to better understand the process of the gathering of the information and have a clearer idea on how the inquest is held and how the coroner comes to a verdict. All this was useful to develop a critical view that was necessary in the process of data-entry and in writing the dissertation
Q6 This part was complete in my opinion
Q7 Yes
Q8 It was helpful to clarify and create a logical process in order to identify the information we were looking for
Q10 It was helpful to have a wider idea of how this process was made
Q11 It was a bit hard at the beginning to order all the information we had been given, so I think it could have helped to spend more time on the completion of np-SAD forms with you
Q12 Working in small group and discuss the ideas
Q13 No, since it was an individual task we were due to prepare our work on our own
Q15 It did not help in my opinion
Q17 We did not need to visit the coroner to write our dissertation or to think at the proposal, as the information that we targeted were already given in the coroner’s forms
Q18 A review of the cases we extracted for our dissertation
Q19 The most important thing was to review the proposal of the research (also the fe[e]dback concerning the selection of valid and strong criteria to base the dissertation on)
Q20 Everything was useful
Q21 It would have been better to have a co[n]stant help (someone expert) when needed and not waiting for it to arrive some days later
Q22 Either by memory or by reasoning, and most important with practical learning
Q23 I would have spent more time to the coroner office
Q24 Taking part to the whole process of holding an inquest perfectly matched with my preferred way of learning, as it gave the chance to touch with hand what was going on