

***CURRICULUM MAPPING: ARE YOU THINKING WHAT I'M THINKING? A VISUAL COMPARISON OF STANDARDIZED, PRESCRIPTIVE PROGRAMMES***

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**Abstract**

This study compared how five clinical teachers, when given no formal template, visually mapped a life support programme. The aim was to compare teacher's interpretations of the operationalization of short, standardized and extremely prescriptive programmes. The 'teachers' were doctors enrolled in a Clinical Education course at Newcastle University. Five maps were compared looking at orientation, curricular design and gaps. Theoretically, there should be little room for interpretation as content is explicit, assessment is set and teaching materials provided. Comparison of the maps demonstrated striking variations in the interpretation and mechanics of the teaching process and the basic tenets of curriculum theories. Three main themes emerged -theoretical approach, assessment and evaluation. Exemplified is the complexity of mapping a simple, structured programme and supports the need to further investigate large, complex programmes if a functional map and communication tool is to be created.

**Key Words:** *Curriculum, curriculum mapping, teacher's views, comparison, variations.*

**1. Introduction**

Curriculum mapping has been instigated as a move towards curriculum management and improved quality assurance processes (Willett 2008). Recent literature

supports the need to construct computer-based curriculum maps and software (Willett 2008; Prideaux 2003). This does not appear to be driven by educational beliefs or philosophies but by using technology to **improve** the process. This study was an attempt to explore these educational beliefs and philosophies. Five candidates undertaking a certificate in clinical education (MClinEd) ‘mapped’ a standardized programme or curriculum of their choice. The curriculum and curricular maps were viewed by the researcher as social constructions influenced by a multitude of factors including prior experience, educational trends and discourses, political and cultural influences (Gergen 1999). As such, the maps offered insights into the candidate’s interpretations of the operationalization of the curricula and the social, theoretical and cultural factors influencing that interpretation (Crotty 1998). In order to explore operational perceptions and answer the three research questions:

- 1) How do the students perceive the curriculum?
- 2) Which elements are represented and which are omitted?
- 3) What relationships between curriculum elements do the maps depict?

Comparisons were made between the five, looking at orientation, curricular design and any gaps that were found. The maps were strikingly variable.

The literature has been presented in four main sections: curriculum mapping, current trends in curricular reform, curriculum theory and finally curricular design. Curriculum mapping and curricular reform are initially addressed to provide a foundation upon which to build this research. Curricular theory is addressed followed briefly by curricular design, as both topics relate to the findings in this paper.

### **1.1 Curriculum Mapping**

One would not leave on an expedition without an itinerary and clear map. If education is viewed as a journey, it could be argued that teachers should have similar resources available to guide and signpost them. Curriculum mapping provides these tools. The definition of 'curriculum' is difficult and contested in educational literature (Burton and McDonald 2001). For the purpose of this paper, curriculum is defined as the blend of content, educational strategies, assessment, timetable and evaluation. Therefore, it is the entire complex experience. Curricular mapping is a visual representation of this experience. This mapping process spatially represents different components of the curriculum so the relationships and connections are easily seen (Harden 2001). Curriculum maps are functional tools representing operational processes behind what is 'happening' in a programme and are tools for linking different aspects of a curriculum (Harden 2001). They are not new concepts. Novak used graphic representations, simple boxes and circles, examining children's understanding of scientific knowledge in the 1960s (Novak 1964). Curriculum mapping is a powerful tool for managing the curriculum (Harden 2001). Educational programmes usually have a set syllabus and timetable. However, these reflect what is **supposed to happen**, not a clear picture of **what actually happened**. Curriculum mapping is not simply a translation of the timetable and syllabus into a flow chart, it is a method of collecting data about what is actually happening and being taught (Koppang 2004). The purpose is to create a functional tool which guides its users through the various elements of a curriculum. The users may be students, teachers, faculty members, curriculum planners, evaluators or coordinators. Prideaux (1993) explains that regardless of the audience, mapping shares the common purpose in demonstrating scope, complexity and cohesion within a curriculum.

## **1.2 Trends in Curricular Reform**

Two recurring flaws concerning curricular improvement and development have been identified. Firstly, the absence of curricular theory and secondly, communication concerning curricula (Prideaux 2003; Johnson 1967; Harden 2001).

The last ten years have been characterized by a noticeable interest in medical curriculum reform (Papa and Harasym 1999). Recently, curriculum mapping appears to be part of this reform. Johnson (1967) argues, however, that scholars interested in curriculum reform projects are often concerned with improving programs as opposed to gaining insight into the nature of curriculum. He also argues that even educational practitioners involved in educational research are not particularly concerned with curricular theory, suggesting that the concern seems to be a practical one, improving the curricula, not studying it.

Harden contends that it is communication about the curriculum that is a neglected area in medical education (Harden 2001). Curricula are often contested and problematic and recent moves towards transparency and open critique have changed values and expectations. Prideaux (2003) claims if a curriculum is to remain responsive and useful, it must be in a form that can be communicated. A possible solution regarding the lack of communication appears to be curriculum mapping. Curriculum mapping is being instigated in UK medical schools in a move towards electronic management, communication and improved quality assurance processes (Willet 2008; Prideaux 2003; Harden 2001). However, the best method of approaching both the reform and communication around curricula remains unclear. This need has been identified and has provided funding opportunities. Recently, the IT department within Newcastle University

Medical school has obtained funding for £200000 as part of a ‘Dynamic Learning Maps’ project which has been funded as part of the JISC (Joint Information Systems Committee) programme. The concept is to develop a navigable curriculum map for the 4 year MBBS (Bachelor of Medicine) programme. The focus is the use of technology to create a functional tool to assist in communicating elements within the curriculum. To create a functional tool for a massive programme, such as the MBBS, is a Herculean task. The technology behind such an undertaking is certainly an instrumental component. However, as designers, knowing how teachers implement, visualize and operationalize programmes of learning is essential. The need to incorporate technology into curricular mapping is unequivocal. Technology aside, there is a recurring danger that non- educationalists interested in curriculum reform may be more concerned with improving programmes, rather than gaining increased insight into the nature of curriculum (Johnson 1967).

### **1.3 Curricular Theory**

Historically, educators have been at war with what the nature of the ‘curriculum’ should be. Schiro (2008) explains different people have different visions of what the curriculum should look like. These visions are based on curricular ideologies or philosophies. These ideologies are collections of ideas or comprehensive visions. Individuals advocate different goals for education and varied methods of achieving those goals. The nature of learning, role of the teacher and student and the purpose of assessment and evaluation are fundamental elements that make up a curriculum. Unless there is a clear understanding of these beliefs or ideologies, decisions, consensus and most importantly, communication concerning the curriculum cannot occur. Since the curriculum is a result of human agency, it is underpinned by different values or ideologies

(Prideaux 2003). Schiro (2008) classifies these ideologies according to four major groups: social reconstruction, social efficiency, scholar academic and learner centred. This paper will focus on social efficiency and learner centred ideologies. These correspond to what Ross (2000) labels the objectives driven and process driven curricula. These two were chosen because of their relevance to the findings within the research.

Advocates of social efficiency, according to Schiro (2008) believe the purpose of education is to train students in skills and procedures they will need in the workplace. It is about the efficient production of an end product: the educated person. This individual, once successfully completing a programme of learning, will have met the terminal objectives set by educators, and therefore fulfil a role in society. Social efficiency advocates believe, to meet the needs of society, students should be able to function as mature contributing members by being competent and by being able to perform. Teachers select and implement educational strategies designed to help students acquire behaviours prescribed within a programme of learning. Behavioural objectives are used and students practice to gain and maintain skills. Thus, within the social efficiency or objectives driven ideology, there are two main, relevant concepts. Primarily, there is a concept of some planned change in the student's behaviour (learning). Secondly, the role of the teacher is to create and prescribe the sequencing of learning (causes and actions) leading to the desired responses and reactions (Schiro 2008; Ross 2000).

According to Schiro (2008), learner centred advocates focus on the needs of individual students, not society or academic disciplines. The goal of education is personal growth within the student's unique social, emotional and intellectual attributes. Proponents of this ideology believe individuals have their own capabilities for growth and they must

actualize these capabilities. The students themselves are a source of content for the curriculum. It is their needs that are considered the end point for a programme of learning. Individuals are encouraged to grow and construct new meaning after interaction with intellectual, physical and social environments. The belief is that learning: the construction of meaning, is unique to the individual. Therefore, in a learner- centred, or process- driven ideology, there are two distinctly different concepts to those outlined above. Primarily, it is the idea that context, environment and interaction are the basis of curricula. Secondly, it is the role of the teacher to create these contexts to assist students to grow and construct meaning (learning) and knowledge for themselves (Schiro, 2008; Ross, 2000).

It is apparent that these two ideologies approach both teaching and learning from distinctly different paradigms. Differing views and competition behind visions of curricula have caused conflicts and have inhibited progress in the process of curriculum development (Schiro 2008). For basic progress to occur, clarity and communication concerning individual beliefs and epistemological understanding is essential. Therefore, the introduction of technology as a method of improving systems is justified, only if understanding and exploration are primary considerations.

#### **1.4 Curricular Design**

After reviewing the findings of this research several points of interest were identified in relation to the actual design of the curricula. Therefore, a brief discussion outlining two elements within a curriculum was necessary.

There are various ways of approaching and conflicting beliefs surrounding curricular design. Although educationalists approach this task differently, two elements are

consistently addressed: assessment and evaluation (Kern 1998; Prideaux 2003). For the purpose of this paper, these two elements will be addressed in more detail, specifically as they relate to medical education. Kern (1998) explained that a logical systematic approach to curricula development is necessary as medical educators strive to be ethical and accountable to learners, patients and society. Part of this approach includes the necessity of including assessment and evaluation in a programme of learning. He states that assessment is a measurement of a student's performance and may be summative or formative. Evaluation, according to Kern (1998), is a necessary step and can be used to gain support, answer questions concerning effectiveness or examine the relative merits of an educational approach. Prideaux (2003) identifies four important elements in any curriculum, one being assessment and one evaluation. He reinforces the definitions and purposes that were identified above. As mentioned earlier, the literature in this section is not an exhaustive look at definitions and functions of assessment and evaluation, it merely identifies that these two elements are essential in any formal programme of learning. Differing epistemological beliefs may support different definitions or functions of assessment and evaluation within an educational programme. However, the essential inclusion of these two elements within curricula is unambiguous.

## **2. Methods**

The Master of Clinical Education (MClinEd) programme is a postgraduate programme at Newcastle University. It is designed for health professionals, who are currently involved in clinical education in the UK. The majority of candidates on the programme are doctors who presently have teaching roles. At the certificate level, candidates are required to take three modules; one of them entitled Understanding

Curricula. It is within this module that the research was done. As part of their course work, candidates were asked to choose any programme they wished and visually draw or 'map' it as part of their final submission. Written consent was obtained from those candidates who agreed for their maps to be used after submission for research or presentation. They were given a brief lecture concerning curriculum mapping and shown some examples. However, no template was given or any formal structure. Candidates were encouraged to map their programmes with no prescribed educational format or software boundaries. No restrictions were imposed as it was thought they may interfere with how the candidates visualized what 'was happening: it was thought that instead of visualizing independently what was occurring, candidates may try to fit their programmes into the template or format given. The main point that was stressed concerned operationalization. It was made clear to candidates the point of the map was to represent what was actually going on in the classroom. It was reinforced that it was not a simple translation of the syllabus or explicit programme.

The programmes chosen varied considerably from a simple one day workshop to five year specialty training. Six candidates were actually instructors on the ALS (advanced life support) or the NLS (neonatal life support) programmes (these are standardized programmes developed by the Resuscitation Council UK to assess competency in cardiopulmonary resuscitation) and chose to map these programmes. The writer chose to compare the six ALS and NLS curricular maps due to the prescriptive, standardized nature of the sessions. Of the six maps, five were chosen for discussion in this paper, as they were felt to most accurately demonstrate the variations. Only one map was excluded as it was almost an exact replica of map 5 (figure 5) and including it would have

contributed no new information. This purposive sampling was strategic and allowed the researcher to compare maps that were relevant to the research question (Bryman 2008).

After the maps were submitted, a simple visual comparative analysis was done by the researcher focusing on the visual representation and relationships within the map. It is similar to the 'write and draw' technique described by McWhirter, Collins *et al.* (2000), which was developed for curriculum development. This simple qualitative tool is used to understand how ideas and concepts are constructed as individuals map what is 'happening', usually in a programme of learning. The researcher invites candidates to draw and write what is happening in the classroom. The technique is open ended, but focuses on the issue under consideration. These drawings are later analyzed, examined and broad categories or 'issues' are formed. (MacGregor and Currie 1998). Although this 'write and draw' technique was developed for children, McWhirter (2000) argues that it is a valuable qualitative tool for curriculum researchers and evaluators. The implementation, or what was actually happening in the program was the issue. This study was not concerned with comparing outcomes but was essentially illuminative, looking at awareness, perceived implementation and application of knowledge. This philosophy is supported by Stenhouse (1975) who specifically argues the necessity of examining the **process of implementation** of the curriculum, not just the outcomes.

The five maps were analyzed and compared looking at which elements were present, the connections between different elements, the shape of the map, the text within the map and the design itself. After this analysis, the broad issues or categories of theoretical approach, assessment and evaluation were formed.

### **3. Results**

The maps chosen to compare were formal workshops in which the learning outcomes, content, teaching methods, assessment, timings and evaluation were set. The teacher delivered the assigned content within the timings given and provided the pre-set assessment. The programmes were structured, standardized and internationally recognized.

A brief overview of each map is given below. The maps presented striking variations in how the candidates visualized the operationalization of the ALS and NLS course. A more in-depth discussion of the results follows the maps and the results are presented in three categories:

- Theoretical approach, Assessment, Evaluation

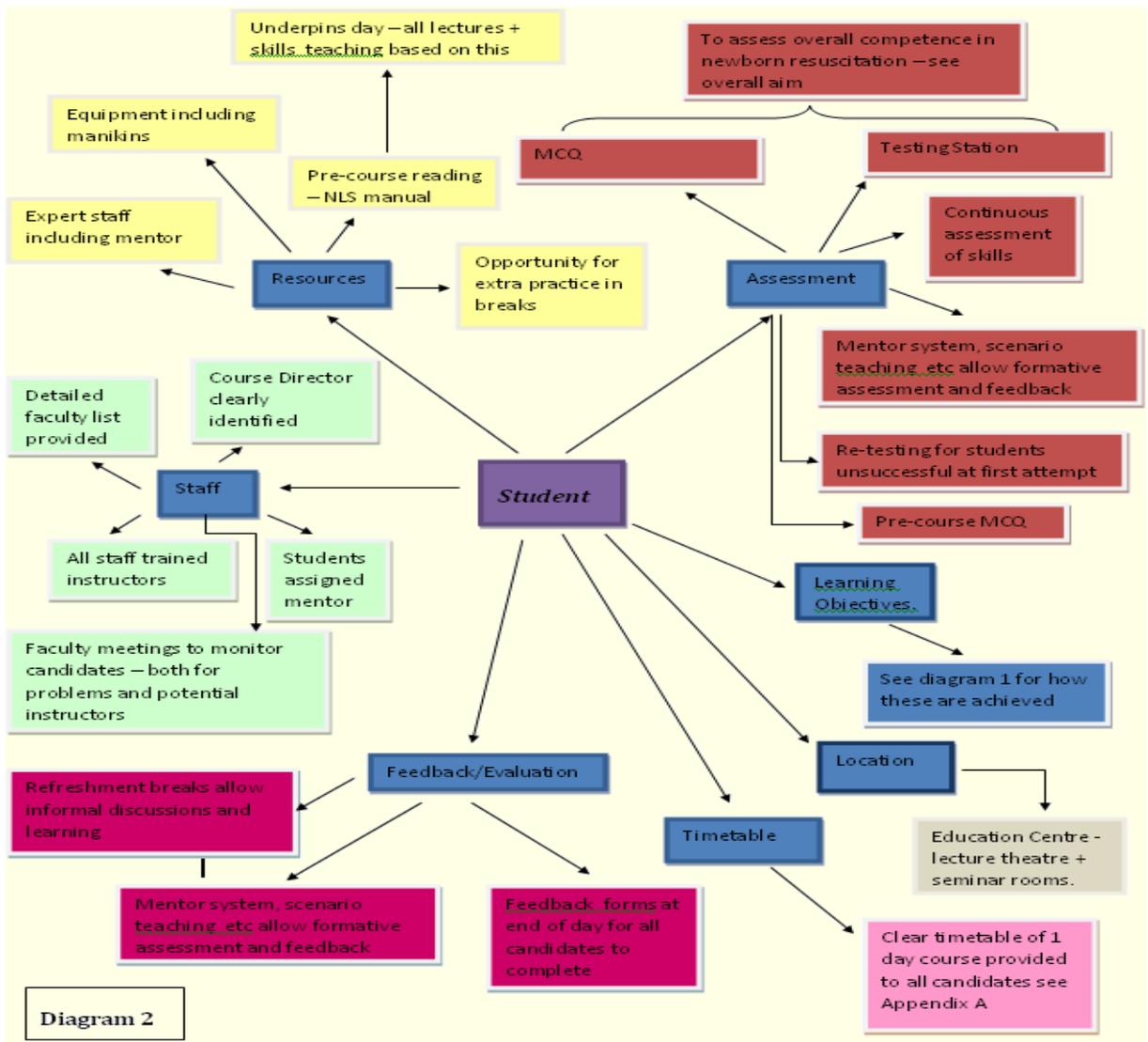


Figure 1

In this map, the students are represented at the centre of the programme. All other aspects seem to stem from the students. From the central focus of the student radiates assessment, evaluation, learning objectives, staff and resources. Summative assessment is identified as overall competence and formative assessment and feedback are labelled. Evaluation itself is a major factor in this candidate's map. There are informal discussions and an end of day evaluation form. The candidate does not appear to visualize this evaluation feeding outside of the session.

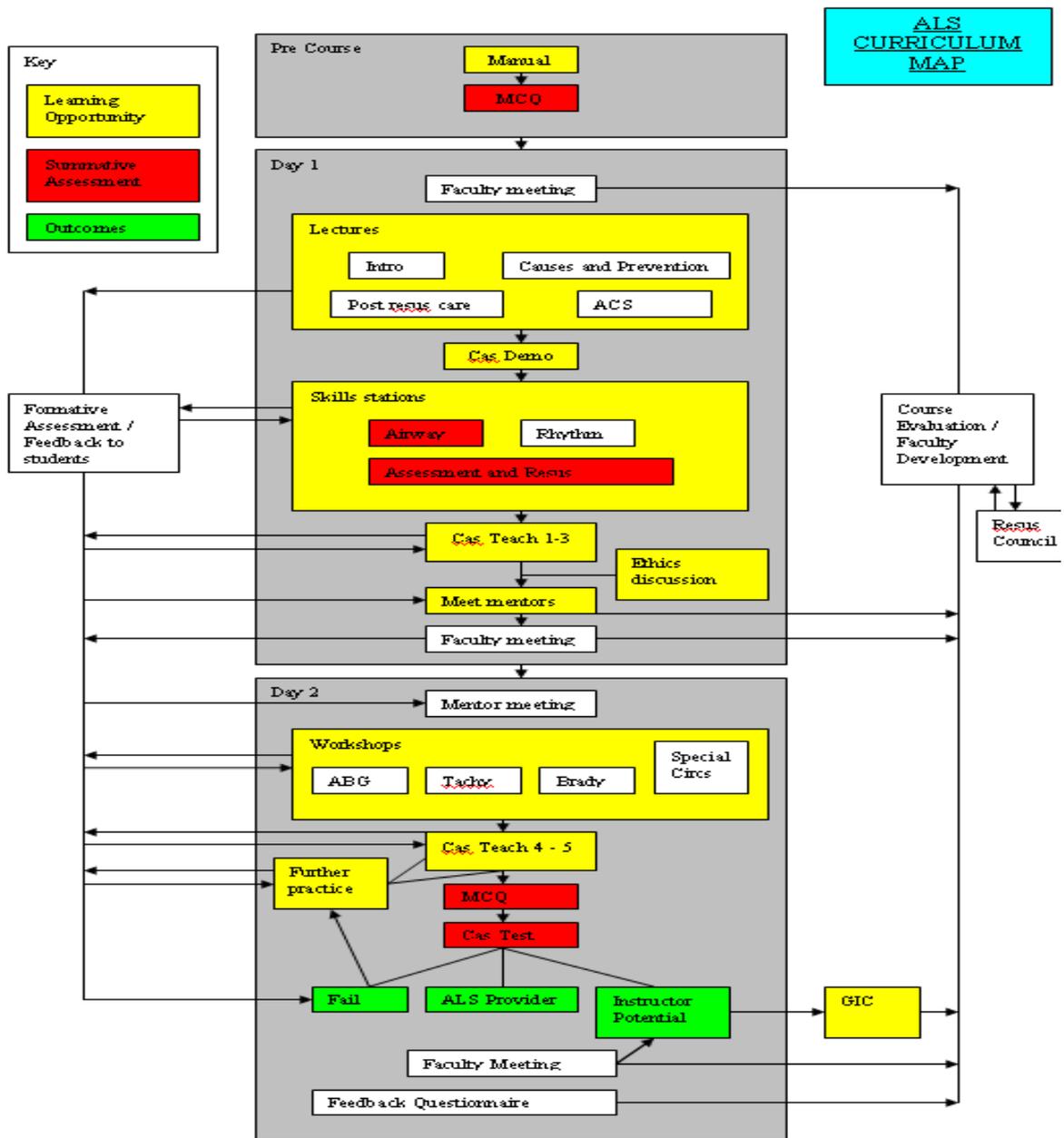


Figure 2

Students are not explicitly labelled on this map. Learning opportunities appear to be the biggest component. Summative assessment and outcomes are the major end-point. Formative assessment and feedback are clearly labelled and appear to be integral to the entire programme. Evaluation is clear, structured and the connections are multi-faceted. This candidate has visualized the evaluation (feedback questionnaire); contributing to the faculty meeting, faculty development and resuscitation council is clear and structured.

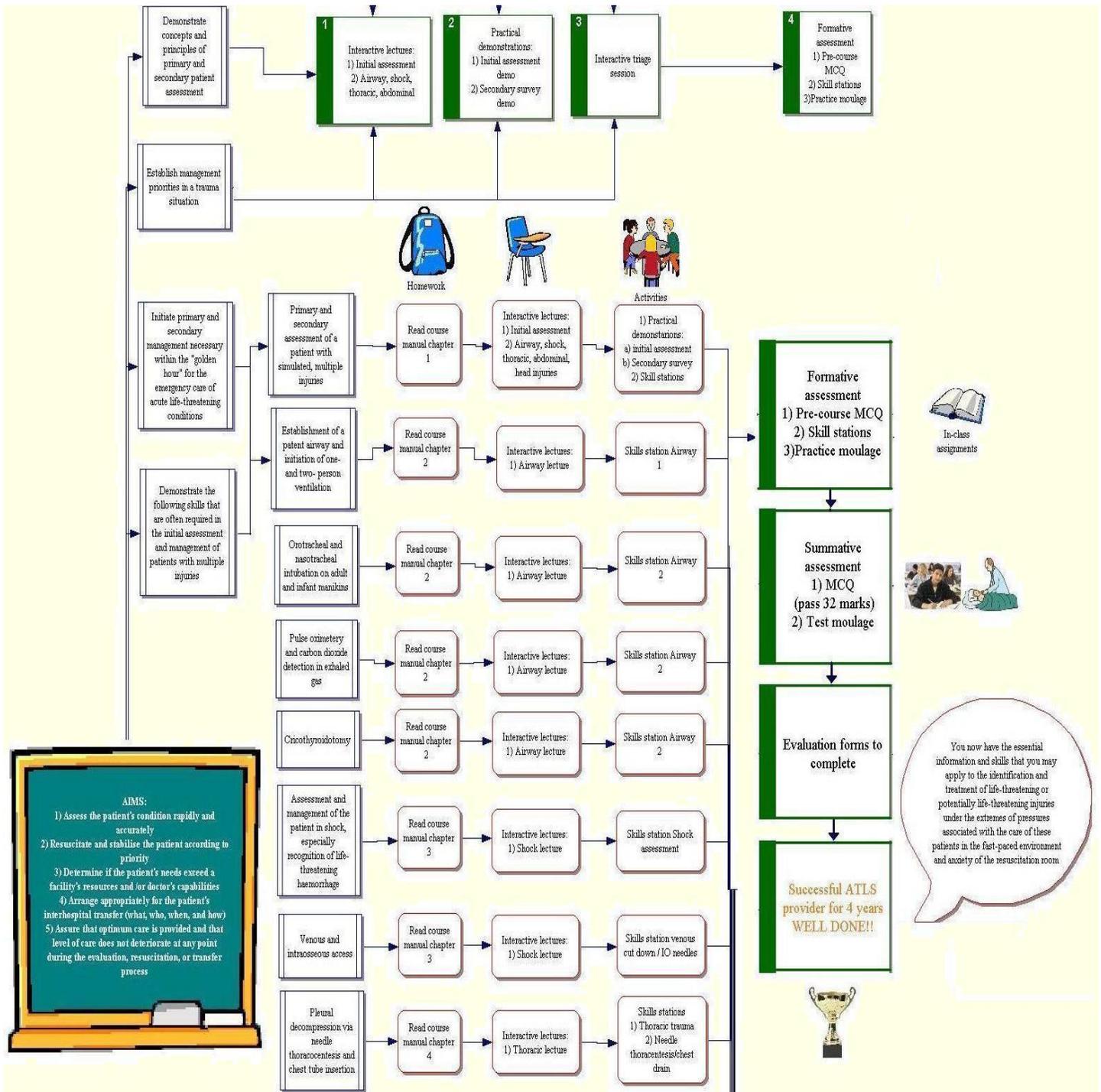


Figure 3

This linear programme has clearly identified aims, followed by structured learning opportunities and objectives. Formative assessment is labelled, although feedback is not. Competency, through criterion referenced assessment is identified. Evaluation is present but the only relationship appears to be the students filling out forms. There is no feedback

of this evaluation out of the classroom or back into the program at a local or regional level.



Figure 4

This complex map places students at the centre of the learning experience. The students are the central visualization in this map and outcomes, opportunities, staff and assessment radiate and are further broken down from the 'student' centre. Assessment is labelled but

no value or description is evident. There is no mention or apparent role of either formative assessment or feedback. Evaluation, to this candidate is not labelled as part of the programme whatsoever.

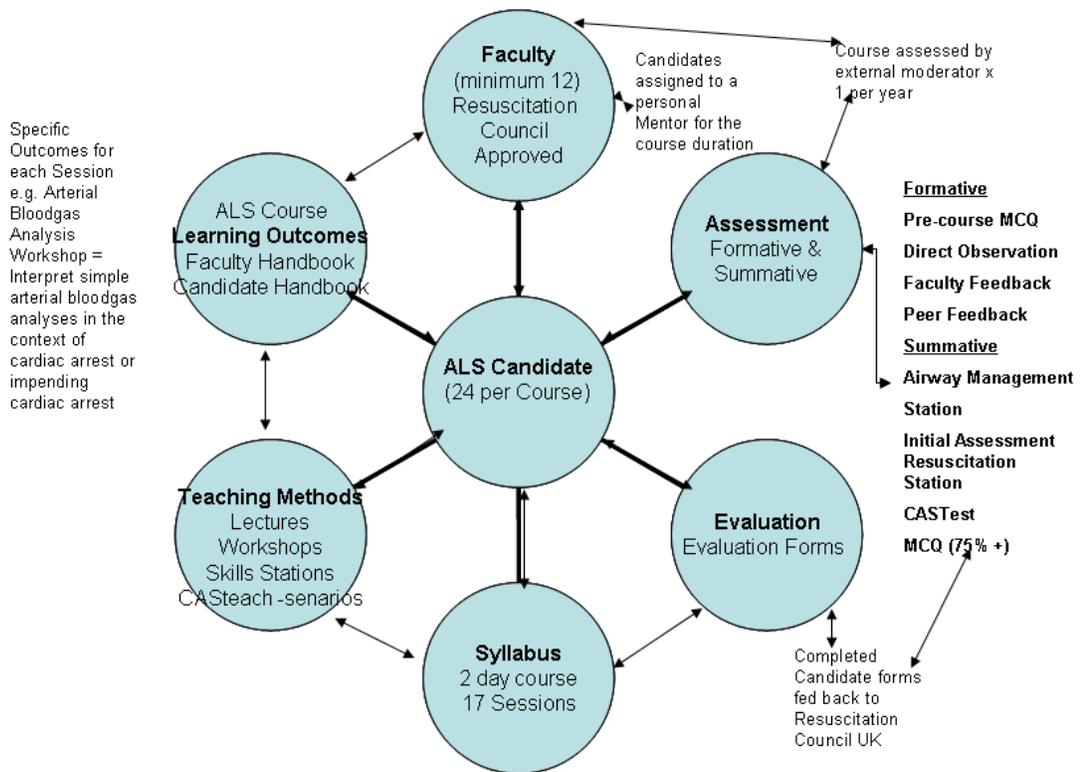


Figure 5

This more simplistic map identifies the students as the centre of the learning process. Again, the outcomes, assessment and evaluation stem from the centre. Interestingly, however, this candidate visualizes it as a cyclical process. Although the students are the centre, the rest of the elements within the curricular design appear to have a reciprocal communication so the programme has multi levels of interaction. Assessment, both summative and formative is labelled. Summative assessment is divided into specifics as is formative assessment. Interestingly, this map also explicitly sub- divides formative feedback. Evaluation is explicit and feeds back to the Resuscitation council.

### **3.1 Theoretical Approach**

Three of the maps (Figures 1, 4 and 5) present the course as student centred or process driven (Schiro, 2008; Ross, 2000). The students appear to be at the centre of the programme and the learning outcomes, assessment, evaluation, staff resources and even timetable seem to radiate from the central focus of the learner. The students are clearly labelled as the core of the programme and the other elements stem from the centre and are further broken down into components. Only one of these maps appears to be cyclical in nature. In figure 5, there appears to be reciprocity and communication between the student, who is in the centre of the programme, and all of the other elements listed. Although this map has the learners as the centre, it is not as unilateral as the other two student- centred maps. These learner-centred maps all appear to have the individual as the focus. As discussed earlier in the literature, in learner- centred ideologies, the students themselves are a rich source of content for the programme (Schiro 2008). It is this interaction of the students with the environment that provides the basis for the curricula. The basic belief is that the context, interaction and environment are the basis for curricula. This is evident in all three student- centred maps.

Figures 2 and 3 appear to be a traditional outcomes based or social efficiency programme (Schiro 2008; Ross 2000). The aims and objectives are specifically labelled and that is the definitive starting point. The course structure and learning experiences are clearly structured and the final product is assessment. There is nothing cyclical concerning the programmes. In both maps, the students are not explicitly labelled or identified at all. It is not about the individual learner or his/her interaction with the environment. Learning opportunities or experiences appear to be the biggest component. These are clearly

expanded and the relationship between these opportunities and the course content are overt. In both maps, there appears to be a linear progression from aims, through experiences to assessment or competency. The focus provides the opportunity for training in specific skills to achieve terminal objectives in the workplace. There is a prescribed programme of learning created by the teacher and an expected change in behaviour (skills) by the learner. This approach to curricular design follows a traditional outcomes based / social efficiency approach. This approach is clearly evident in Figures 2 and 3.

### **3.2 Assessment**

Summative assessment is explicitly labelled on each of the five maps. All of the candidates have identified that this element is necessary and an integral part of the course. However, there are differences in the relationships between assessment and the rest of the elements. In figure 3, one of the outcomes- based maps, the candidate has made it clear that assessment is the end point and has transparently identified it as criterion referencing with a pass mark of 32. Formative assessment is identified and structures feeding into this process and the components of the feedback are clear (Figures 1, 2, 3 and 5). In figure 2, formative assessment and feedback appears to be integral to the entire programme. Figure 4 does not address formative assessment or feedback at all.

### **3.3 Evaluation**

Evaluation differs greatly within the mapped documents. Evaluation is clearly labelled in Figures 1, 2, 3 and 5. Evaluation in Figure 2 is particularly involved. Evaluation is transparent and the connections this candidate has visualized include the evaluation and feedback questionnaire contributing to the faculty meeting, faculty development, mentor development and resuscitation council. In Figures 1 and 3, the

evaluation is identified, but the candidate does not clearly map who is evaluated or where this evaluation feeds. Figure 5 identifies evaluation only as forms, but does link it outside of the sessions to the Resuscitation council. In Figure 4, evaluation is not labelled as part of the explicit program at all.

#### **4. Discussion**

The maps were strikingly variable. This research showed the complexities in asking individuals to visualize what was really ‘going on’ in the classroom within a prescriptive programme. This illustrated not only a different conceptualization of the elements and relationships within the programme, but indeed a major disparity in the educational model. These maps all served the purpose of showing the scope, relationships and cohesion within these courses. Two distinct, but incredibly interesting areas are highlighted and should be researched in more depth

- The theoretical underpinnings or educational stance to which the candidates appear to have subscribed
- The elements that make up a curriculum and how the candidate has visualized these

Elements: specifically the role of assessment and evaluation

Several maps (Figures 1, 4 and 5) suggested students were the centre of the programme, thus subscribing to a learner- centred, progressive or humanistic approach to curricular theory. As mentioned in the literature review, this educational stance has specific beliefs or philosophies that affect the entire teaching and learning experience. Conversely, in Figures 2 and 3, students were not explicitly labelled at all. These two maps appeared to

be based on a linear progression of aims, followed with structured learning opportunities and finished with assessment leading to competency. This would suggest a social efficiency or technical rational approach to curricular theory. Different categories of educational theories are not mutually exclusive and it is common for curricula to draw from more than one school. However, irrespective of which theories are chosen, these must be rationally applied to the curricular design in a manner that provides theoretical coherence for decision making and is consistent with the underlying philosophy of the curriculum (Wong 2006).

Assessment ascertains whether the curricular content has been learned successfully (Wong 2006). Assessment was explicit to all of the candidates. However, the role, relationships and position of this assessment varied tremendously. The role of formative assessment and feedback was inconsistent between maps and in one case, absent.

Activities within curriculum evaluation contribute to value judgements on the merit and worth of a programme (Wong 2006). The goal should be to contribute positively to programme improvement. Again, a dichotomy was seen in the maps which may reflect how these candidates viewed the role of evaluation. Evaluation was not diagrammatically represented on one map, yet clearly linked to the syllabus, candidate and faculty development in another.

## **5. Conclusions**

In order to further advance medical education, its practice needs to be better informed by the educational research literature (Wong 2006). Interestingly, when reviewing the literature, there was little found on which to base this paper. No studies were found asking different teachers to map the same standardized programme or

curriculum. Although exploratory, this study reveals striking disparities in the results of such a comparison. The diagrams demonstrate complex variations in the interpretation and mechanics of the teaching process, and of the basic tenets of the curricular theoretical process. Bearing in mind the current trend towards electronic mapping, this exercise exemplifies the complexity of even a simple programme. Again, the use of technology and software to assist in curriculum mapping is unequivocal. When writing about curricular design in medical education, Prideaux (2003) supports the use of curricula maps with computer based graphics. However, he explains that the maps must have a balance between clarity and detail. McDaniel *et al.* (2005) further identify the need of careful consideration when developing relationships within a map. They argue that the format should depend on the individual using the tool. This research supports that consideration. It is necessary to step back and investigate exactly what the individual teacher's understanding and beliefs are about ideologies, assessment and evaluation. This research suggests there is a need to avoid static templates or pre-set formats that interfere with what is actually happening. The mapping process has the hazard of becoming an academic or 'filling in the boxes' activity. There is a danger of the focus becoming one solely of improvement and action as opposed to one of understanding and inquiry. Large, complex programmes, such as the MBBS, will require huge investments of resources and planning for successful mapping. In such programmes, only by exploring how teachers individually implement, visualize and operationalize programmes can a functional map and communicative tool be created.

### **Further Research**

The value of these simple maps cannot be underestimated. However, they are just that, simple maps. Further research, inquiry and discussion with candidates surrounding their maps would be invaluable. Open discussion with teachers concerning personal theoretical underpinnings and the nature or value of elements within a curriculum is imperative. Colliver (2006) argues, “best evidence medical education” has been impeded because theory has been inadequately used to guide research and practice. Harden (2001), when discussing curriculum mapping in medical education, identifies the first step as investigating the potential users of the map and their needs. It is not about technology, but about communication and exploration. Communication within teaching and learning is necessary. If there is this much variability within these prescriptive programmes, how can we possibly hope to use technology to create a functional map and communicative tool without input from those responsible for delivering the programmes?

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