

Knowledge Management: London Taxi Cabs Case Study

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ABSTRACT

There has been a resurgence in recent literature on the most effective way of managing organizational knowledge for competitive advantage. Such discussion (e.g. Covin and Stivers, 1997) usually includes the development of computer-based information systems for tracking collective knowledge.

This paper considers an example of a successful 'knowledge' management activity, which has been in existence for the last 140 years and has not used any form of information technology. The activity concerns the legal requirement for London taxi cab drivers to learn what is colloquially described as 'the Knowledge', which comprises tacit knowledge of London streets and associated 'places of interest'.

This paper reviews the rigorous procedures necessary for aspiring cab drivers to acquire the much sought after status of a London cab driver, from both practical and theoretical perspectives. It also considers possible computer-based support tools for testing and learning purposes.

Keywords

Knowledge management, London Taxi Cabs, internalization.

1. INTRODUCTION

There have been a number of recent surveys of knowledge management practices in North America (Davenport et al, 1998; Covin and Stivers, 1997). Two recent UK initiatives have included the appointments of Programme Director, Knowledge Management at ICL (Lank, 1997), whose definition of knowledge management is: 'in order to maximize value to customers, we must have an outstanding capability to create, enhance and share intellectual capital across ICL's global organization'; and Knowledge Manager at the British Council, who aim to be a 'knowledge organization', because it believes that its competitive advantage will be gained by its ability to be the source of knowledge about the UK to overseas clients (and similarly, a source of overseas knowledge for UK clients) in its areas of expertise.

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Nonaka and Takeuchi (1995) believe that little attention has been paid to how organizational knowledge is created and how the knowledge-creation process is managed, contrasting the Japanese understanding of knowledge with that of Western thinking:

Japanese companies, however, have a very different understanding of knowledge. They recognize that the knowledge expressed in words and numbers represents only the tip of the iceberg. They view knowledge as being primarily "tacit" – something not easily visible and expressible.

The distinction between *explicit* and *tacit* knowledge can be summarized as:

Explicit – the formal, systematic, 'hard' knowledge, that can be expressed in terms of formulae, algorithms and general principles. This type of knowledge may be processed via computer-based information systems.

Tacit – The informal, intuitive, 'soft' knowledge, that is built up from experience and is difficult to articulate or express in an organized manner.

A key issue then becomes one of how such knowledge can be created. Nonaka and Takeuchi have postulated four modes of knowledge conversion, as shown below in Figure 1.

	Tacit knowledge	<i>To</i>	Explicit knowledge
Tacit Knowledge	Socialization		Externalization
<i>From</i>			
Explicit Knowledge	Internalization		Combination

Figure 1. Four modes of knowledge conversion

These four conversion modes are defined as:

1.1 Socialization: from Tacit to Tacit

Socialization is a process of sharing experiences and thereby creating tacit knowledge via shared mental models and/or technical skills. The use of language is not obligatory. 'On the job' training is a good example of this type of conversion.

1.2 Externalization: from Tacit to Explicit

Externalization involves the conceptualization of images, metaphors, analogies, hypotheses or models. A good example is the writing process, where the written word captures and communicates the writer's thoughts and experiences.

1.3 Combination: from Explicit to Explicit

Combination is concerned with assembling concepts and existing explicit knowledge into a set or database and thereby creating new explicit knowledge.

1.4 Internalization: from Explicit to Tacit

External experiences are internalized into individual tacit knowledge in the form of shared mental models or technical 'know how'. A good example is 'learning by doing'.

A fuller discussion of these modes, together with examples of supporting IT, systems is provided in Nonaka et al (1996).

While most of the current literature relates to modern organizational practice e.g. Covin and Stivers surveyed Fortune 500 and Post 300 firms, this paper considers the management of a far older form of 'knowledge'. For the last 140 years, there has been a legal requirement for London taxi cab drivers to learn what is colloquially described as 'the Knowledge'. This comprises knowledge of London streets and associated 'places of interest'.

The paper is in two sections. Firstly, a description of the required official procedures to gain the status of a licensed London taxi cab driver. Secondly, a discussion of the learning process, from practical and theoretical perspectives, and how this might be enhanced with the aid of computer-based tools.

2. LONDON TAXI CABS CASE STUDY

2.1 Background

"Traditionally black, frequently red, sometimes blue or green, often white but commonly multi-coloured, it is as much a part of London as Big Ben, Piccadilly Circus, Tower Bridge and Trafalgar Square. Uniquely British - but as familiar to the capital's millions of visitors as it is to Londoners - without it the City would be all the poorer. It is the London taxicab." [Malcolm Bobbitt, 1998]

The present London licensed taxi trade is renowned world-wide as one of the city's great institutions and its quality of service is highly regarded. To become a London taxi driver requires an exceptional amount of study and hard work, and entails learning 'the knowledge', which involves remembering intimate details of the capital's street system.

2.2 The Public Carriage Office

The position that the London taxi trade presently enjoys as arguably the world's premier taxi trade owes much to the control

exercised by the Metropolitan Police Service. As the Licensing Authority for the Metropolitan Police District and the City of London (an area of some 800 square miles), the Metropolitan Police Service has been responsible for licensing cabs and drivers for over 150 years.

Day to day control is carried out by the Public Carriage Office, which was set up in 1850. It has developed and maintained the guidelines for all aspects of the trade, from the criteria, which an individual needs to satisfy to obtain the coveted cab driver's licence to the technical requirements, which each cab must meet.

The Licensing Authority's overriding consideration is the protection of the fare paying passenger and the public at large in London. In seeking to provide that protection and reassure the customer as to their safety and the quality of service they can expect, each applicant for a licence is required to satisfy five basic requirements:

- to be old enough
- to be of good character
- to be fit, both physically and mentally
- to have a thorough knowledge of London
- to be able to drive a taxi competently and safely.

2.3 The Green and Yellow Badges

There are two types of licences, which are generally referred to by the colour of the respective oval-shaped badges. The Green Badge allows plying for hire throughout London e.g. the City, West End and Heathrow Airport, while the Yellow Badge covers the sixteen suburban sectors outside central London. There are currently about 22,500 licensed London taxi drivers - 20,500 Green Badge and 2,000 Yellow Badge holders. (Public Carriage Office, 1998).

2.4 'The Knowledge'

'Knowledge of London' examinations were introduced in 1851 following the Great Exhibition in Hyde Park, when drivers were severely criticized for not knowing where they were going. Initially only main roads between major points in the capital needed to be known.

The Public Carriage Office supervise the examinations and state that: "You are required to know any place within the Metropolis to which a member of the public may wish to go". An early example of a mission statement!

This thorough knowledge of London includes the location of: streets, squares, clubs, hospitals, hotels, theatres, government and public buildings, rail and tube stations, police stations, courts, diplomatic buildings, important places of worship, cemeteries, crematoria, parks and open spaces, sports and leisure centres, benevolent institutions, societies and associations, places of learning, restaurants and historic buildings; in fact everything to be able to take passengers to their destinations by the most direct routes.

The "All London" licence, requires a detailed knowledge of 25,000 streets within a six mile radius of Charing Cross with a more general knowledge of the major arterial routes throughout the rest of London. Outside the six mile radius, London is divided into sixteen sectors, so that to gain a "Suburban" licence, a detailed knowledge of a specific sector is required,

along with a more general knowledge of central London. Additional sectors may be added once licensed.

Candidates are requested to attend an informal group interview at the Public Carriage Office. At the end of the talk candidates are handed the infamous 'Blue Book'. This 'Blue Book' is regarded as the training cabbies 'bible'. This book lists the basic 400 routes or "runs" which candidates are required to know as a minimum requirement. However, the 'Blue Book' is only issued to those who are studying for the "All London" licence. Suburban applicants are given a sheet of 30 "runs" for the chosen sector. These runs provide the basic framework for learning 'the Knowledge'.

At this stage, candidates are instructed to learn the 'Blue Book' and only contact the Public Carriage Office once they have completed the contents. It is not the responsibility of the Public Carriage Office to train applicants. The Public Carriage Office merely tests knowledge of London to confirm the required standard. Although Examiners can provide advice, such as:

- what the Public Carriage Office expects from candidates in regard to personal conduct
- what is involved in learning 'the Knowledge'
- how to learn the routes or "runs"
- basic information about "Knowledge" schools.

Candidates are informed that 'the Knowledge' cannot be learnt from a book. Candidates must go out and travel around London to acquire the depth of knowledge required. Not only the "runs" listed in the 'Blue Book' must be learnt, but also the places and buildings of interest within a ¼ mile radius of the start and finish points of each run. For this, a moped or motor-cycle is usually used, because of the mileage to be covered.

The length of time needed to study 'the Knowledge' depends on each individual candidate and how much time and effort they are prepared to devote to the task. The "All London" licence can take between 24-36 months from the initial talk e.g. by going out regularly 3-4 times a week, for a minimum of four hours on each occasion. This could require travelling in the region of 20,000 miles. For the suburban licence, the overall time scale is considerably shorter, perhaps 6-12 months, but the commitment in time and effort during that period, is no less.

Learning the routes is the hardest part of 'the Knowledge'. It is mentally and physically demanding, disrupting a candidate's family life dramatically (Lambert, 1996). It calls for determination and is not something to be undertaken as a casual enterprise. Approximately one-fifth of all applicants eventually qualify. However, it is very rare to actually fail 'the Knowledge', as in most instances people simply give up.

The major problem associated with learning 'the Knowledge' is that although it is necessary to learn the 400 basic routes in the 'Blue Book', these are just a guide. The questions that will be asked will not necessarily be precisely the same. This is because

rather than the actual departures and arrivals listed, the examiner may ask for an alternative departure point (a point being a location or public building) near to the beginning of the journey and an alternative arrival point at the end of the journey. Therefore, this creates many possible permutations for a given journey.

The first test is in written form. It is based upon the contents of the 'Blue Book' and consists of approximately eight 'Blue Book' runs. Multiple choice questions are asked about these runs, with a pass rate of 65% or more in order to proceed onto the next stage of testing – the 'appearances'.

2.5 Appearances

Appearances are the term used to describe the 15 minute interviews, which take place over a period of time. These interviews are conducted by a Knowledge of London Examiner. [N.B. although all Examiners hold the 'Green Badge' themselves, they are not qualified in any form of 'Knowledge' training, nor do they have any examining qualification.]

An appearance consists of a verbal examination where candidates sit on a chair some six feet from the examiner, who typically sits behind a large desk. Each appearance involves answering questions on how to get from one location to another by the most direct route. Candidates have to mentally work out the best route and recite it verbally, noting all traffic restrictions and indicating the appropriate left and right turns until the destination is reached. The questions asked will typically have little resemblance to the blue book.

Normally, five questions are posed on each appearance and the appearances may last for about two years, increasing in frequency as a higher level of knowledge is demonstrated. However, it must be noted that despite this time span recommended by the Public Carriage Office, the learning period for 'the Knowledge' is typically four years (as evidenced by the Knowledge Schools). During the examinations the examiners will sometimes feign bad temper and shout to determine the candidate's ability to deal with stressful situations. It is an unnerving experience.

There is a standard manner of response to a question. The correct way to answer is to:

- (a) identify the location of the pick-up point and the destination
- (b) begin the route by saying "leave on the right/left". This identifies the direction to be travelled from the start point, i.e. the starting point is on your left/right as you set off.
- (c) detail the route naming every street travelled along, identifying direction of travel and any traffic schemes e.g. one-way systems in operation on the route.
- (d) on arrival at the destination, give the passenger setting down position by saying "set down on the left/right", depending on the direction from which you approached.

N.B. Buildings and side turnings on the route are not required.

At first, each candidate starts on 56 days, which is the number of days allowed between appearances. Once the examiner judges that the candidate has satisfactory knowledge, the frequency is reduced to 28 days, and finally to 21 days. After successful appearances on 21 day intervals, candidates eventually achieve

what is know as the “Req” or requisition (and at the same time, take the driving test). There is no recognized period of time that can be spent on any one particular set of days, and a candidate must continuously go out and learn more routes and points between appearances. If the examiner feels a candidate’s knowledge of London is deteriorating, then they can be put back on to the previous set of days between appearances.

The examiner grades each appearance accordingly, as follows:

- A grade - 6 points
- B grade - 4 points
- C grade - 3 points
- D grade - 0 points
- E grade - 0 points

A candidate must achieve 12 points on each level (i.e. the number of days between appearances) before they are put onto less days between appearances. However, it must be noted that there is no trainee access to the record of questions asked. Also, candidates never know or understand how they have been marked/scored. In one case, someone was allowed to continue with appearances for 18 years, and was never told that he may never be successful.

Candidates may decide when to apply for their first appearance. However, for the “All London” licence, this must be done within two years of the initial talk, and for the suburban licence, within six months. If a candidate fails to apply within these time frames, then they are required to start again and submit a fresh application.

The final stage of the process is to learn how to get between any two outer lying suburban high streets, naming all the restrictions en route, including all the correct names of the roads. This stage requires knowledge of 66 suburban runs i.e. the main roads out of London. Typically, one of several questions that may be asked is Terminal 4 Heathrow Airport to East Croydon Railway Station. It involves around 60 roads, which have to be worked out in one’s head and recited to the examiner in the correct sequence.

This stage usually requires only one appearance at the Public Carriage Office. On successful completion of this final stage, candidates are awarded the licence and the badge needed to start plying legally for hire in a London taxicab. This is known as receiving your ‘badge and bills’. Throughout their careers, cab drivers are monitored to ensure that they conform to the highest standards set by the Public Carriage Office.

This examination process is charted in Appendix 1 and shows the key milestones and appearance frequency, as candidates make progress.

3. THE KNOWLEDGE CREATION PROCESS

3.1 The Learning Process in Practice

To gain the vast amount of required knowledge in this case is a daunting prospect for any individual. This type of tacit knowledge cannot be learnt from a book and requires hours of

driving around the streets of London on a moped, whilst looking at a map. But how can this knowledge be acquired in an effective manner? Somehow this unstructured problem domain must be broken down into a manageable and comprehensive form. One of the leading training schools, Knowledge Point School, has developed a method whereby a network of connected runs is used as a model for learning purposes. Their Fact Sheet No. 1 states:

You need to get a mental visual picture of the journey so that when you do callover practice or attempt to answer the Examiner’s question, then you should have in your mind’s eye flashes of the streets along the way. A recall, just like a piece of film.

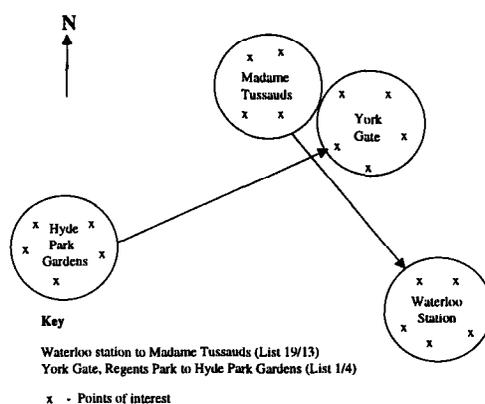


Figure 2. Mental Model of ‘Runs’

Figure 2 shows two Blue Book runs and their associated quarter mile ‘points of interest’ circles. Because there are so many points of interest, it can be difficult for candidates to picture the start or finish point of the journey. However, if a candidate realizes that York Gate is very close to Madame Tussauds, the second run can be mentally ‘connected’ to the ‘Waterloo to Madame Tussauds’ run. In this way, an accurate cartographic picture of the whole of London can be built up.

Classroom sessions at the Knowledge Point School are taken by an experienced Trainer, who guides students through the runs and checks on their progress. Students continuously switch from poring over a large street map to reciting runs from memory. In this way, a gradual improvement in learning can be made as students physically follow the routes, commit the relevant details to memory, and attend the School.

Figure 3 provides a historical record of appearance statistics since 1950. The high number of days from the first appearance to finals (with a peak of 1196 during the recession of 1995-96) confirms the demands placed on candidates in this gruelling activity. The lack of feedback during appearances and uncertainty associated with their eventual completion provides a psychological pressure, which is reminiscent of Kafka’s ‘The Trial’!

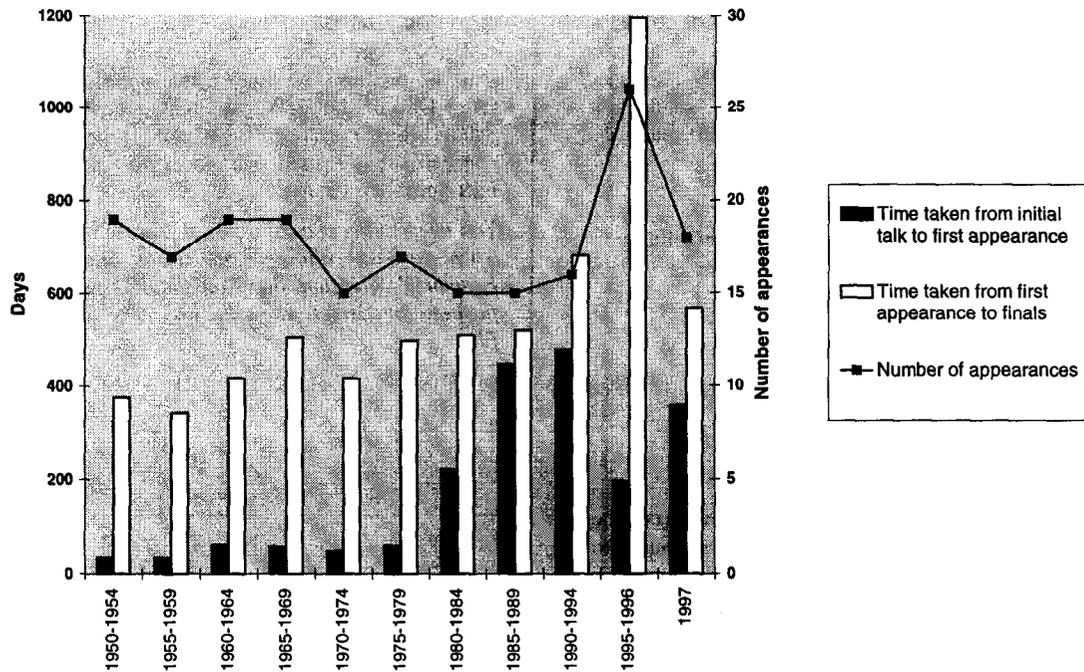


Figure 3. Frequency of Appearances (1950-1997) [Source: Public Carriage Office]

3.2 The Learning Process in Theory

There are two key issues regarding the theoretical perspective of this process. Firstly, this case study provides a clear example of the difference between *information* and *knowledge*. Secondly, the case illustrates one of the four modes of knowledge conversion i.e. internalization.

3.2.1 Information vs. Knowledge

It is difficult to distinguish between information and knowledge as the terms are often used interchangeably. Nonaka and Takeuchi (1995) assist in making the distinction:

First, knowledge, unlike information, is about beliefs and commitment. Second, knowledge, unlike information, is about action. It is always knowledge "to some end". And, third, knowledge, like information, is about meaning. It is context-specific and relational.

In this case, an individual, the prospective cab-driver, gleans information from the street maps of London. This is then converted to tacit knowledge by touring required streets and learning the 'Blue Book' runs. This tacit knowledge can then be put to important use, when finding the shortest route from one given point to another *and* knowing associated places of interest in the capital. The tacit knowledge then has real value.

3.2.2 Internalization: Learning 'the Knowledge'

This case study is a good example of knowledge conversion via internalization. The experience of touring the streets of London and using the available maps enables the individual to build mental models, which may be put to use in their work. This visualization process is colloquially described as 'seeing it' and is the key to successfully completing the 'appearances' schedule.

4. CONCLUSIONS

So what are the lessons for today's organization from such a well established, tried and tested case study of knowledge management?

4.1 Organizational Learning Environment

There is a marked difference between this case and most organizational environments. The whole exercise of acquiring the requisite knowledge of London streets and routes is undertaken in a very traditional, old-fashioned and typically English manner e.g. when making appearances, candidates must be smartly attired and address the Examiner as 'Sir'.

The knowledge examinations are very much a test of individual character, temperament and commitment, whereas a modern business environment is usually a competitive arena, where political skills are necessary to succeed.

4.2 Key People involved in the Process

There are a number of key stakeholders in this activity:

- Metropolitan Police
- The Public Carriage Office

- Examiners
- Candidates
- Knowledge School Trainers
- The public

In effect, these stakeholders form a knowledge organization, which has the following attributes:

- A high level of individual commitment
- Knowledge sharing via the Training Schools
- The highest standards of quality control
- Public Trust in the London Taxi Cab service
- No use of Information Technology

Nonaka (1994) proposes three models for organizational knowledge creation, i.e. Top-Down, Middle-Up-Down and Bottom-Up. This case study represents a 'bottom-up' approach, where the agent of knowledge creation is the very entrepreneurial character, the prospective cab-driver. Perhaps not commonly described as an entrepreneur, the licensed cabbie is nevertheless, a self-sufficient individual who has total control of the way in which he operates his business. As a self-employed person, he can choose his hours of work, the locations he visits and even whether to add advertising to the side of his cab.

Furthermore, the synergy between the respective stakeholders is a key element in the overall success of this activity. Each group has a responsibility to maintain a close working relationship to ensure that the 'Knowledge of London' learning and testing process is carried out effectively and rigorously. In this way, the highest possible standards expected by the public can be maintained.

4.3 Lack of Technology in the Process

Technology has no role to play at any stage in the whole exercise, yet the licensing process is highly successful and the envy of many other international cities.

Many of the published case studies referred to earlier suggest that the use of knowledge-based systems (e.g. based on LOTUS NOTES) are critical to successful knowledge management within an organization. However, the London Taxi Cabs case study has shown how clear and well-defined objectives with a rigorously enforced set of procedures can produce a 'centre of excellence' in knowledge management. Too often, there is an over-emphasis on the use of technology at the expense of setting clearly understood and shared business objectives. For successful organizational knowledge management, the willingness of staff to create and share knowledge will be critical factors.

4.4 Possible Role of Information Technology

In 1998, the Private Hire Vehicles (London) Bill was passed in Parliament (Jones, 1998). This Bill seeks to extend licensing and regulation of minicabs to London, which is the only UK city where this does not apply. The fact that London mini-cabs are not required to be licensed has long angered black cab drivers. The corresponding Act of Parliament will mean that there will be an even greater number of drivers who will need some type of licensing. However, this will not mean that everyone will be

subjected to the extensive testing procedures involved in learning 'the Knowledge', although a smaller-scale testing process may be needed. This legal development, together with the long time periods from first to final appearances, as shown in Figure 3, suggests two possible roles for Information Technology as a supporting tool.

4.4.1 Testing

Some form of computer-based testing would be the most basic way of using IT in order to cope with any increased examining requirement. The interaction with any such system would need careful design, as prospective cab drivers come from a wide range of social and educational backgrounds, e.g. touch sensitive screens may provide the most suitable input method.

Such a facility would also provide a detailed historical record of a candidate's progress, but would demand appropriate administrative support and management in its operation and question design.

4.4.2 Learning Aid

A study to consider possible aids to the learning process has been proposed in collaboration with the knowledge training schools. This will examine how computer-based tools might assist in learning the blue book runs. One possibility is to develop a prototype in the form of a multi-media package, which will provide a geographic overview of London with detailed descriptions of the 'blue book' runs and associated places of interest.

The introduction of computer-based tools for testing and learning will require careful management, as current job roles will be affected within the key stakeholder groups. The associated social, economic and political issues will therefore need to be considered.

5. ACKNOWLEDGMENTS

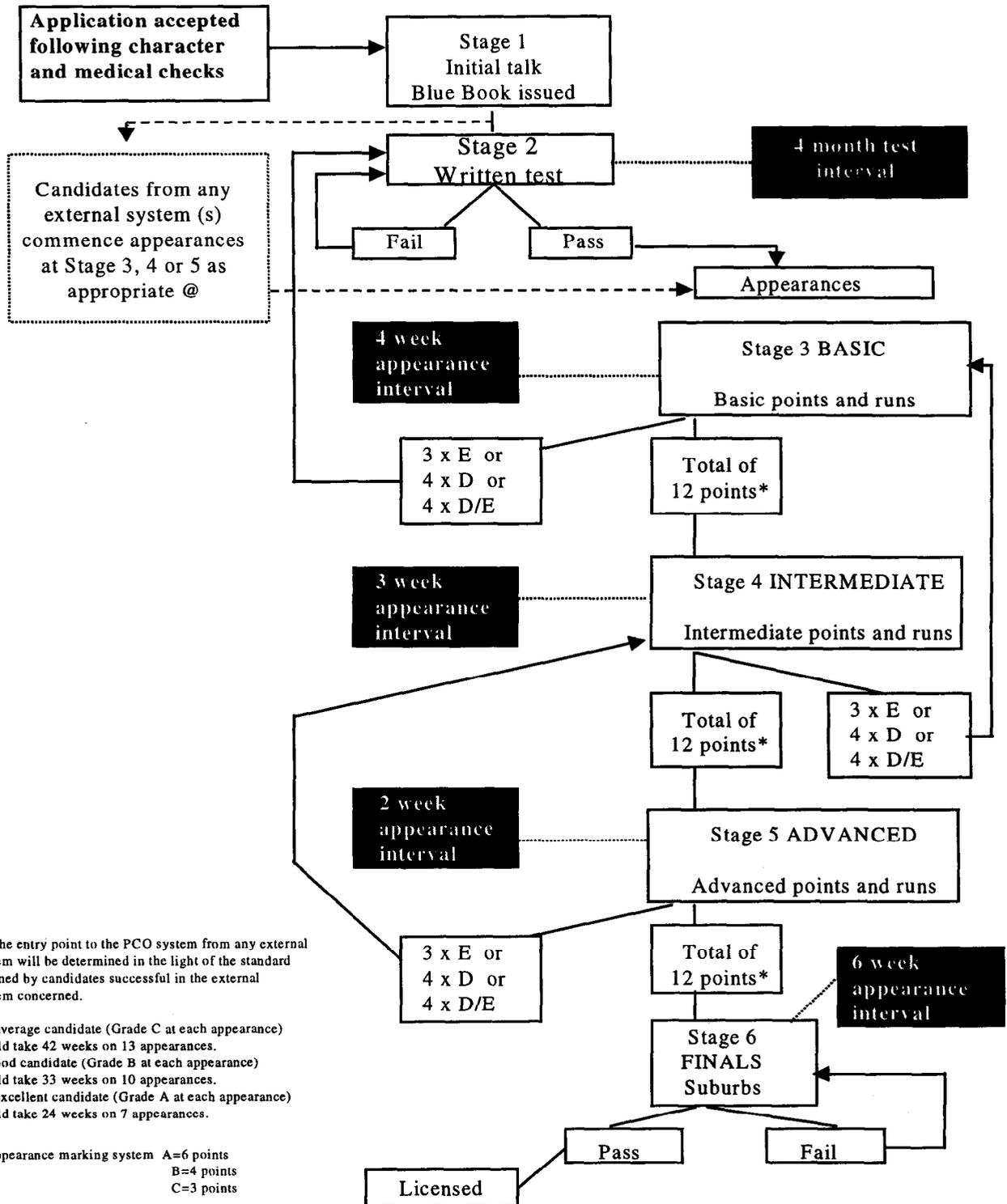
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APPENDIX 1. KNOWLEDGE OF LONDON EXAMINATION PROCESS



@ The entry point to the PCO system from any external system will be determined in the light of the standard attained by candidates successful in the external system concerned.

An average candidate (Grade C at each appearance) would take 42 weeks on 13 appearances.
 A good candidate (Grade B at each appearance) would take 33 weeks on 10 appearances.
 An excellent candidate (Grade A at each appearance) would take 24 weeks on 7 appearances.

* Appearance marking system A=6 points
 B=4 points
 C=3 points