



Research Article

## The Quad-Tutorial: ‘Content, Context, Challenge and Communication’: Utilizing 5 minute Education Recipes

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### Abstract

The Quad-tutorial uses principles to provide a forum for both facilitator and learners to partake in learning, communicate, receive feedback and re-enforce knowledge. Over a four year period, one hundred medical students attended a one hour Quad-tutorial for 8 consecutive weeks (4 students: Individual-activity components); followed by 100 students over a two-year period attending for 8 consecutive weekly tutorials (8-students: Paired-activity components). Each 60 min Quad teaching session, consisted of four components [*Content, Context, Challenge, Communication*] with 5 min student performance or activity, immediately followed by 10 min questions and feedback from peers and facilitator. The content was based around a health topic relevant to the learning curriculum. Formative evaluation of the tutorials, suggested that the students found the educational structure interesting, useful and felt confident in their performance of their end-of-block written and clinical exams. The Quad-tutorial exposes students to a range of information through multi-sensory stimulation and rehearsal, with educational principles which encourage new knowledge retention and enhances the skills of decision-making, decisiveness and effective communication.

### Introduction

*"We remember what we understand; we understand only what we pay attention to; we pay attention to what we want"*  
Edward Bolles.

Information exchange is so rapid now that traditional methods of education are inadequate to prepare learners for use in modern organisational structures. This information should be readily imbibed by using flexible learning practices.

The changing circumstances of social and work environments anticipate the immediacy of learning. The opportunity to focus on new learning is dependent on previous experiences and understanding the process itself. At all levels, training elements are required to achieve the relevant competence. Doctors require novel training components to glean and retain new skills; patients also need to acquire health knowledge and skills to self-manage their medical condition. With easy access to the internet, learners experience an explosion of information. This ‘action learning’ gives the learner the opportunity to develop self-efficacy and capability, using their skills such as reflection and environmental scanning. It also values experience and interaction with others. This principle of learning is a non-linear process and true learner self-direction.

The educational goal is to optimize long-term memory retention. Presently, there is insufficient evidence to conclude whether classroom formats, practical projects, online modules or other methods utilised are best effective. A cognitive illusion exists between what the student thinks they are learning and what is actually being learnt. Most learners believe they learn more from ‘massed’ information (such as inductions) than from spaced presentations. Studies indicate that this compression of learning into a too short period is likely to produce misleadingly high levels of immediate

mastery that will not survive the passage of substantial periods of time [1] (Figure 1).

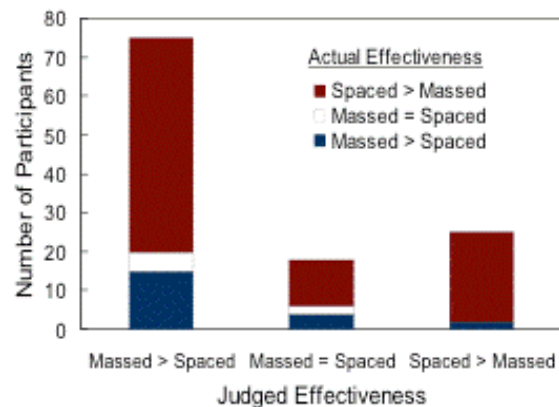
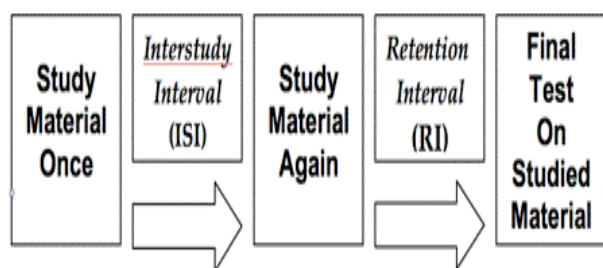


Figure 1: Participants were divided according to their actual performance in spaced conditions.

Simply presenting information does not achieve the desired educational goals or preparation of learning for future context. Medical Educational research has focused extensively on assessment issues as test-enhanced learning is seen to potentially strengthen clinical knowledge and lead to improved expertise. Such assessment research concludes that clinical expertise should be founded on a secure bank of knowledge and developing effective memory networks which then allows easy access to that knowledge.

Learning also improves with active participation, sharing of opinions and problem-solving strategies and feedback. Feedback is an important part of test-enhanced learning. The well-known research by Skinner [2] on operant conditioning held that immediate feedback is essential for effective learning: Instructors must not delay in letting learners know if a given response is correct, and instantly correct any response that is wrong.

Pashler et al. [3] showed that when participants correctly recalled an item during initial learning, providing or withholding feedback had no appreciable effect on long-term (two week) retention; however, when errors occurred during learning, providing feedback with the correct answers boosted performance on the final test by 500%, compared to a no-feedback control condition. To improve memory, tests should be used often but should be administered over time. Tests that require effortful recall (short-answer or essay tests) produce greater gains than do multiple-choice tests (Figure 2).



**Figure 2:** Schematic design of experiment of the spacing effect used in Quad-teaching.

Participants study or target material on two occasions is separated by an inter-study interval (ISI). Their memory for the material is tested for memory after a retention interval (RI) measured from the end of the second study occasion. The optimal memory performance when the inter-study interval (ISI) is between 10 to 20% of the retention interval i.e. a one-day gap ISI for a one-week retention interval and One-week gap ISI for retention of 5-10 weeks.

When considering these educational aspects, the Quad-tutorial was developed as a 'hybrid teaching method' as it utilises group teaching but combines self-directed learning of topics related to an individual's need, envelopes the principles of heutagogy of information-centred learning, encompasses case-based or contextual learning with aspects of the traditional lecture-format, promotes memory retention by regular testing, provides immediate feedback and promotes active participation of each member of the group.

## The Quad Tutorial

### • What problem was addressed?

The medical curriculum course content, teaching and examinations includes clinical paediatrics. During the eight-week attachments, once weekly 60 min tutorials with students became repetitive simply presenting information did not achieve the desired educational goals nor learning for retention into long-term memory. This one-hour tutorial then

was developed by the author into the 'Quad-tutorial' which was preferred by learners and tutors alike.

### • What was tried?

The one hour 'The Quad-Tutorial' has four components each consisting of 5 min student performance or activity; immediately followed by 10 min questions and feedback from peers and facilitator. The Quad-tutorial provides scaffolding for students to seek out 'Content-knowledge'; to bring to the learning forum 'Contextual-material' and learn through speed-performance of 'Challenge-questions' and process knowledge through practise of 'Communication-roles'.

Students do independent, self-directed study before returning to the group to discuss and refine their acquired knowledge; use contextual material arising from a problem case or scenario to define their own learning objectives; have weekly peer-group testing of curriculum content; students are empowered to process and problem-solve during discussion, so by using experiential techniques appropriately, this accrues knowledge and competence. Each student has the chance to perform before their peer-group. Students then receive feedback from their peers and conduct a self-evaluation.

### • Who tried this?

The Quad-tutorial was utilised for 100 Graduate-entry medical students over four consecutive years as small group (4 participants: Individual activity for components) teaching method and with 100 Undergraduates (8-15 participants: Paired activity for components) over two years. Both groups had an eight-week Clinical Paediatric attachment with a conventional programmed timetable which included clinical activities and other tutorials, followed by assessment with University standardized exit examinations.

Formative evaluation of the evolving tutorials conducted, suggested that the students found the educational structure interesting and useful and reported they felt confident in their performance of their end-of-block written (knowledge-test) and clinical exams (case-presentation test). Of 50 formative feedback responses analysed from each group, the Quad-Tutorial student experience comments have been extremely positive. Example "I really enjoyed your sessions, they were dynamic and enjoyable, and made a nice change from the norm."

### • What advantages?

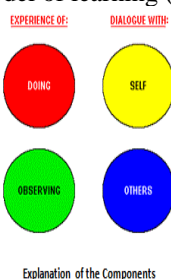
By providing identity or specific roles of each student and their tutor, all can partake in the learning process; use learned skills, perform tasks and develop new areas of learning. The student has the opportunity to display abilities at their level: The tasks are individualised, focused as SMART objectives, adaptable and attainable assignments. The presentations ranged from simple to more complex concepts, lecture to interactive student role-play. Generally each student enunciates a minimum of six times during the hour tutorial. Most importantly it allows success for each student, boosts their confidence and learning.

## Conclusions

Capable people can cope with a turbulent learning environment by possessing an all-round capacity. Learning into long-term memory improves with active participation in the educational process and is more effective when there is sharing of opinions and problem-solving strategies. In a new learning situation, students are likely to feel stress, confusion and naturally learn at different speeds. Minor anxiety may increase motivation to learn; excess anxiety may cause barriers of fatigue or inability to concentrate and even the physical environment in which structured activities take place can affect learning. Pashler proposed that educational failures often reflect problems in retaining information over time, rather than in acquiring the information in the first place [4]. Using regular weekly experiences this spaced-effect of learning method provided a method of optimal memory performance and encourages a feeling of ease when working with others.

This method supports the proposal by James et al. who suggest a positive learning climate hinges on a combination of participants' characteristics [5].

During eight consecutive tutorial weeks, the Quad-tutorial centred the learning on self-efficacy by encouraging participants to experience four educational methods. This encouraged participants to know how to learn and use the principles of active model of learning (Figure 3).



### Dialogue with Self:

A learner thinks reflectively about a topic, This is "thinking about my own thinking" but it addresses a broader array of questions than just cognitive concerns. Eg keep a journal for a course, to develop a learning portfolio by write about what they are learning, how they are learning, what role this knowledge or learning plays in their own life, how this makes them feel,

### Dialogue with Others:

In traditional teaching, when students read a textbook or listen to a lecture, but it is limited because there is no back-and-forth exchange. A much more dynamic and active form of dialogue occurs when a teacher creates an intense small group discussion on a topic. Whoever the dialogue is with, it might be done live, in writing, or by email.

### Observing:

This occurs whenever a learner watches or listens to someone else "Doing" something that is related to what they are learning about. This might be observing the teacher do something, listening to other professionals performs or observing the phenomena being studied (natural, social, or cultural). The act of observing may be "direct" or "vicarious." A direct observation means the learner is observing the real action, directly; a vicarious observation is observing a simulation of the real action.

### Doing:

This refers to any learning activity where the learner actually does something: make an oral presentation (communication). Again, "Doing" may be direct or vicarious. Case studies, role-playing and simulation activities offer ways of vicariously engaging students in the "Doing" process. A vicarious "Doing" (i.e., role playing).

**Figure 3:** A model of active learning.

During participant presentations, the peer-group had a forum to applaud individual creativity; the facilitator's presence meant this situation was a safe, familiar environment for the participant to demonstrate their ability in expressing themselves in novel ways, while improving any deficiencies of knowledge. This presents a platform of a positive learning environment.

Our participants were assigned tasks to seek out relevant material to enhance their knowledge or rectify any gaps; the four components motivated learning by preparation, presentation and performance and feedback and thus a variety of ways to encourage participation during the 60 min of teaching; a variety of activities, opportunity for peer-group to give immediate positive feedback, and the role of facilitator to address any personal concerns or weakness. Participants are recognized and applauded during each activity and can contribute their unique style.

Sass adds that the facilitator's role is crucial to maintain enthusiasm, organization and provide tasks with appropriate difficulty level so that new learning of material occurs without information exhaustion [6]. A combination of these factors is the various preferences that adults have on entering the learning environment (Table 1).

Physical Factors	Emotional Factors	Learning Factors
Learning Setting	Social Needs	Learning Styles
Noise Level Lighting Temperature Structure Time of Day	Learn Alone Learn with Others Motivation: Extrinsic Intrinsic	Auditory Visual Kinesthetic

**Table 1:** Learning environment conditions affect learning: Adult preferences regarding a learning environment.

An instructor must recognize that adults' preferences in these areas may affect their responsiveness in the session. Efforts should be made to accommodate differences by providing a variety of learning activities in which participants may feel comfortable.

The Quad-tutorial also used co-operative learning, when using paired-participants to perform activities; this advocates many social benefits and allows experience and development of skills for future workplace, particularly as participants are exposed to different styles of thinking, tackling problems and creating joint presentations.

The Quad-tutorial uses the principle of memory accretion which benefits from combining a repetitive component during tutorials, enhanced by opportunities for review at time-spaced intervals; providing variety of ways to maintain interest of the learner and facilitate the development of interpersonal, professional knowledge-based and cognitive skills. The Quad-tutorial method proposes that consecutive weekly five-minute activities could enhance memory and performance.

## Recommendations

The Quad-tutorial principle exposes learners to a range of information through multi-sensory stimulation and repeated weekly rehearsal. These activities encourage group-work participation as well as learner-focused subject learning. Repetition accrues knowledge, confidence and improves memory retention. Performance enhances the skills of presentation, decision-making, decisiveness and effective

communication – all these qualities that are needed in the health environment. The advantage is that the principles of this method of learning-facilitation through using 5 min education recipes of 'Content, context, challenge, communication' can be adapted for other groups such as patients for specific health conditions; utilised in family or parent group education sessions or adapted by all allied non-health persons by simply altering the content that requires exploration.

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