

# ITEM Evolution

*Conference Discussion Group Paper*

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**Abstract:** This paper presents the output of a discussion group formed at the ITEM 3.7 Working Conference. The main theme of the discussion group was to consider the evolutionary nature of IT in Educational Management.

**Keywords:** School information systems, Evolution, Stages of Growth, Educational Management, information technology

## 1. INTRODUCTION

The 'shape' of our discussion group is longitudinal. Essentially we considered ITEM in terms of "past, present, and future". The paper commences by reviewing core theoretical foundations – stages of growth theories and evolutionary models.

With this as a basis, we then use these models to interpret the recent history of ITEM developments in a number of countries. "Stories" from each case/country can be mapped to different stages of evolutionary sophistication.

Having reviewed the 'past', we then turn our attention to the present. In this section, we highlight the perception that ITEM in schools is on a journey. We certainly haven't arrived, and it's questionable whether one can ever "arrive". We acknowledge that evidence of 'success' is thin, although we cannot now conceive running a school without ICT as a core service. The mixed evidence from School Performance Feedback Systems is indicative of this journey.

The discussion group then turned to consideration of perspectives on future evolutionary paths for ITEM. Areas of discussion included Web 2.0, School/Home partnerships, IT Consumerisation, MLEs, Technology integration and unification, Privacy and Personalisation.

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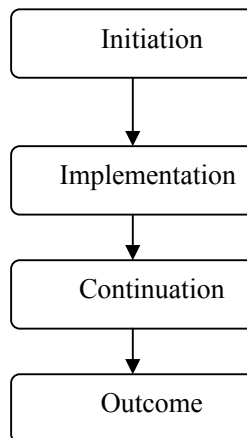
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The discussion group concluded by noting that the future of ITEM looks exciting and daunting. The past and present have witnessed amazing developments in IT in Educational Management. These developments do indeed exhibit evolutionary characteristics.

## 2. THEORETICAL FOUNDATIONS

When analysing the evolution of ITEM it is perhaps wise to do this within a theoretical framework. The problem here is – “What framework to use?” In two papers in the late 1970s Nolan (1977, 1979) presented a theory concerning the growth stages through which it automates its data processing activities. This theory was transferred to the field of office automation by Zisman (1978) an area that Visscher (1991) argued has many similarities to the type of application that takes place in schools, when they introduce ITEM. Based on the work of Nolan and Zisman, Visscher (1991, 1995) outlined four stages or levels of what was then called the development Computer Assisted School Administration (CASA). The four levels were defined as ‘initiation’, ‘expansion’, ‘integration’ and ‘stabilisation’ and have strong similarities with Fullan’s (1991) “Simplified Overview of the Change Process” in education.

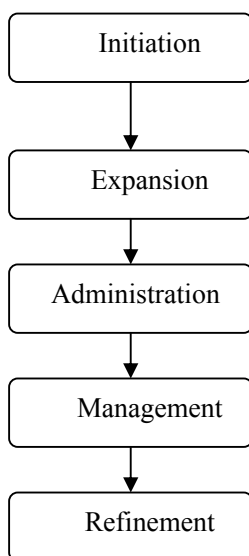


**Figure 1:** A simplified overview of the change process (Fullan 1991, p 48)

According to Visscher (1991, 1995) the initiation level is characterised by software for CASA being developed by a few amateurs working in isolation. As more schools and educational authorities become aware of the potential benefits of the computer the expansion level commences, the numbers of software packages grow, and commercial software developers start to enter the market. However, at this level integrated school information systems are not available and software consists of independent stand-alone applications. Thus, little or no information can be transferred between applications, data entry may be duplicated, and there is little or no possibility of investigating

relationships between various types of data. The goal of automation “in the first two levels is improvement of the efficiency of clerical activities” (Visscher, 1991: p.3) or the improvement of administration.

Whilst it is difficult to disagree with his first two levels of initiation and expansion Visscher claims that: the third level integration can be “characterised by ‘integrated modules’ and ‘the production of management information’”(Visscher, 1995: p.16); and that the fourth level of stabilisation is characterised by computer assistance reaching its full potential with the focus shifting to systems maintenance and refinement. Selwood & Drenoyianni, (1997) argued that these final two levels were somewhat open to debate and that it was possible that systems, even though they may comprise of “integrated modules” may not be flexible enough to provide information for management decisions (Mitchell and Wild, 1993).

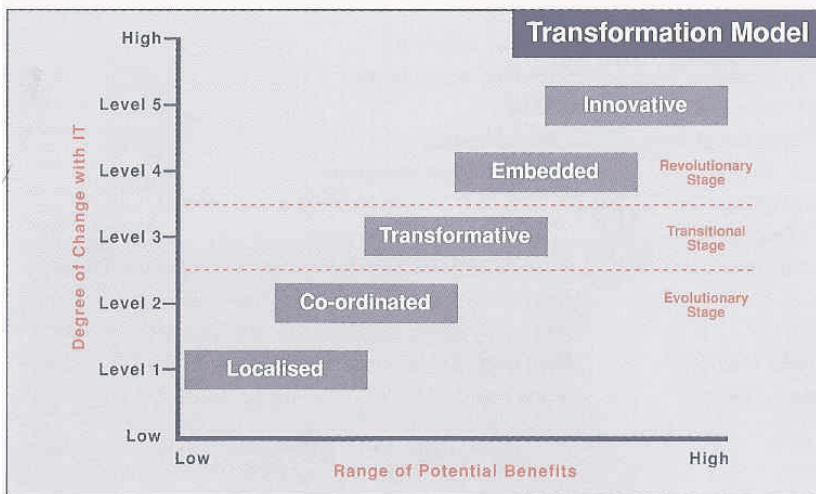


**Figure 2:** Interim theoretical model for progress in ITEM

With the benefit of hindsight Selwood & Drenoyianni, (1997)I suggested that in England and Wales it would appear that the third level of the evolution of CASA was administration - the use of computers to aid school administration and that the fourth level is management – IT being used to aid decision making. The stabilisation level still remained but moved to become the fifth level. However, whether this level is achievable is debatable, as Visscher (2001) states “it presupposes the accomplishment of the full potential of computer-assisted school administration and management...” and “.....software for the full support of managerial work is still elusive” and new technologies “.....promote new types of support for administrative and managerial school staff” (p.14). Selwood (2004) suggested that, as it would appear unlikely that progress in ITEM would cease, the stabilisation

level should be replaced with a “refinement level” where applications and uses are refined. This led to an interim theoretical model.

However Selwood (2004) noted that his interim theoretical framework had strong similarities with that put forward by the MIT's 90 Research Group (NCET, 1995) to model the extent of IT integration within business organisations. The MIT model was adapted by the NCET Educational Technology Project (NCET, 1995) into the Transformative Model (see Figure 3), to provide a model to map the development of IT in schools. The model was primarily used to map the development of IT use in teaching and learning but ITEM was not entirely ignored and the description of some levels include a very brief, and generally not very useful, reference to it.



**Figure 3:** Transformation model (NCET 1995, p8)

- Evolutionary Stage
  - Initiation and Expansion;
- Transitional Stage
  - Administration
- Revolutionary Stage
  - Management and Refinement

**Figure 4:** Theoretical framework for the progress of ITEM

Selwood (2004) compared Figure 3 to his interim theoretical framework and noted that the “Evolutionary Stage” could well cover “Initiation” and “Expansion”. The administration level in the interim theoretical framework could definitely be seen as a “Transitional Stage”. With the final two levels

of the interim framework being regarded as *revolutionary* because they enable significant changes to be made in the processes of education. Therefore a new theoretical framework for the development of ITEM is presented in Figure 4 (above).

However it should be apparent that all education systems will not progress through the stages and levels of the framework at the same rate. Also, different sections of a school will probably progress through the stages at different rates. For example, the Senior Management Team may well be using ITEM for management purposes whilst teachers in the same school may not even be using ICT for administration.

### 3. REVIEW OF PAST EXPERIENCES

There have been a number of significant studies of school Management Information Systems (MISs) internationally over the last 15 years. Amongst them are those focussed on systems in Hong Kong, New Zealand, England and Wales, the Netherlands and Australia covering both primary and secondary school phases and using a variety of research methods.

The School Administration and Management System (SAMS) in Hong Kong has been the subject of 3 studies (Fung et al, 1998; Ip Tsang & Lee, 1997; Fung & Ledesma, 2001a&b) and in the Netherlands Visscher and Bloemen (2001) carried out research using a multiple case study approach to compare patterns in one school against similar and contrasting cases.

In New Zealand research into the Massey University School Administration by Computer (MUSAC) system has included three case studies at a primary, secondary and combined school (Nolan et al. 1996) a further case study of three primary schools (Nolan & Lambert, 2001) and a survey of acquisition and usage patterns (Nolan & Ayres, 1996).

In England the study of the School Information Management System (SIMS) by Wild & Walker (2001) and commentary by Visscher, Wild and Smith (2003) involved a large scale survey of secondary schools whilst Selwood (1995) used a survey based on questionnaires distributed in 1989 and 1991/92. A second study (Selwood, 2004) involved detailed interviews and questionnaire responses from one primary and one secondary school in the spring of 2003 and this was followed by (Selwood, 2005) a study into primary school teachers use of ICT for administration and management. Also in England Strickley (2007) undertook an evaluative case study of primary schools in Birmingham and Hay-Campbell (2006) carried out research with primary teachers.

Finally O'Mahony (1998) referencing research from 1995 (a&b) and 1996 (a&b) describes how schools in New South Wales, Australia, have evolved in their use and perception of MISs.

Although the above cover a variety of different countries and practices general themes emerged from all of them. As O'Mahony (1998) comments,

he found similar trends in the Australian studies to those observed by Barta, Telem and Gev (1995) in other countries.

Whilst progress is clearly marked across the last decade and a half some common elements requiring development remain. In particular the following issues were common in the research:

- use of the MIS limited to administrative tasks;
- lack of MIS availability to all teaching staff;
- unsuitable training and support;
- inappropriate software interface;
- usability and functionality limitations;
- inadequate reporting and decision support facilities;
- lack of user-centric implementation;
- minimal interoperability with other systems.

This is reinforced by Strickley (2004) who notes that systems still need accessibility, ownership, training, trust, and usability and Selwood, in 2005, who suggests that a lack of quality training, time and ICT resources are resulting in low levels of teacher usage of ITEM systems.

## **4. CURRENT STATE**

Anecdotal and research evidence in 2007 and 2008 suggests that the use of an evolutionary framework for understanding ITEM development is useful, but at the same time specific ITEM examples may not clearly 'fit' into pre-defined evolutionary stages. Good 'stages of growth' models should have the following characteristics:

- The model should be descriptive, enabling individual cases to be understood;
- The model should be predictive, enabling future development and growth to be projected;
- The model should be prescriptive, enabling ITEM planners to make recommendations and develop policy and strategy.

Examples drawn from across the world demonstrate mixed progress through arbitrary stages accepted in the literature. In particular, two areas of disconnect were noted by members of the discussion group:

- a) Ongoing lack of integration between ITEM solutions
- b) The difficulty faced by ITEM systems to keep pace with technological change

### **4.1 Dis-Integration**

ITEM solutions are developed to support a wide range of activities at different phases of education – primary, secondary, further education, higher education and adult learning. The broad spectrum of ITEM needs faced by different education providers presents two main problems. Firstly, there is no single ITEM product that meets the needs of all (and in fact, seeking such

a product now appears naïve and unachievable.) Secondly, if it is accepted that multiple products need to be developed to meet multiple needs, there is currently a distinct lack of integration between them. For example, a recent study conducted in the German region of Bremen identified 800 different databases used for supporting educational processes (Breiter, 2008)

## 4.2 Pace of Change

Historically, the nature of ICT implementations in education is reactive, rather than proactive. That is, the education sector in general is a consumer of ICT innovation, rather than an active developer. As a result, a technological lag exists between ICT innovation and ITEM implementations. One example of this is the emergence of MLEs (Managed Learning Environments), which necessitate dynamic links between VLEs (Virtual Learning Environments) are more traditional ITEM management information systems. Whereas the theoretical benefits of MLEs are clear, the programming and developer effort required from educational decision-makers means that the benefits are still many years from being realised. Other examples of technological change are presented in the following section.

The message from a review of the current state of ITEM suggests that some progress has been made in terms of evolution and sophistication, but at the same time much still needs to be done.

## 5. SOME PERSPECTIVES ON THE FUTURE

Many factors continue to impact the use of ITEM – technological, social, statutory, political and financial, among others. The discussion group highlighted some of these perspectives, which are briefly discussed in the following sections:

- **Web 2.0**

Many schools block sites such as Myspace, Youtube, Bebo and the like, yet outside of the school environment students see these as the usual method of communication. School leaders and IT Managers grapple to find the balance between effective use of these new collaborative tools, and the duty of care required for vulnerable groups.

- **Home/school relationship**

Home access to the internet is now very high and still growing, but effective leverage of this access by ITEM systems is patchy. Issues exist surrounding equity of access, authentication, privacy, licencing, supervision and control.

- **Consumerisation – private devices on school networks**

The consumerisation of IT presents new problems to schools and other educational institutions. Students and staff can now purchase a range

of IT enabled devices over the counter in local stores or online. The iPod, iPhone, Smartphone and many other handheld devices are now being brought into schools and there is no way this can be avoided. Issues of security and authentication need to be addressed.

- **Regulatory and reporting issues**

Increasingly there is a greater regulatory and reporting requirement. Schools are being required by governments and authorities to report on a range of aspects of school life. Many ITEM systems include reporting capabilities, but not always as flexible as required.

- **Privacy and personalisation**

Student and parent portals need to be increasingly personalized to allow access to appropriate information. Privacy legislation requires personal information to be stored securely and accessed only by a defined range of people.

- **MLEs**

Managed Learning Environments are evolving from content management systems and learning management systems to become all encompassing. For example, Blackboard has developed from a tertiary directed product into a product for K-12 schools as well and now uses Web 2.0 technologies to develop learning communities. As well as requiring an additional wave of staff professional development, these systems pose system integration issues as referred to below.

- **Systems integration and unification**

With the increased complexity of school life, many different information systems are developed. Over time, those that are useful must be integrated into the main ITEM system to ensure data integrity, interoperability and to enable the development of a complete picture of each student. Unified communications products also provide the potential to better develop immediate communication using: Email, Voicemail, Telephone, Software phones, Instant messaging, On line conferencing from the desktop, Presence, and others. These systems are increasingly integrated into the standard desktop environment.

## 6. CONCLUSIONS

ITEM in schools has exhibited evolutionary characteristics. Evidence from case studies around the world demonstrates this. However, the current state of ITEM in schools suggests that we're still on a journey, and it's not clear what the end point will be (if ever there can be an end-point). Certain elements emerging now, and highlighted through this discussion group, will influence future evolution of ITEM. As a consequence, ITEM as an area of research continues to be valid, vibrant and relevant.



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