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Managing change in "ITEM"

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Abstract

It would be very wrong to assume that given the hardware and software, ITEM innovations can be implemented into schools with automatic success. Using information technology in the educational setting is an innovative process which needs managing. This paper addresses the management of the change process.

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1. "ITEM" AS AN EDUCATIONAL INNOVATION

It would be very wrong to assume that given the hardware and software, information technology can be implemented into educational settings with automatic success. Using information technology in educational management, ITEM, irrespective of scope or scale, is an innovative process which needs managing.

ITEM has a broad scope encompassing management activities in course planning and scheduling, in curriculum, in instructional asessment, in resource utilization, and in counselling, just to name a few. The history of ITEM at the school level, however, is not long. Microcomputer technology, which began in the 1970s, became popular at affordable prices for schools only in the 1980s, and ITEM started to appear under different acronyms like SCAMP, SAMS, SIMS, CAA, CASA, etc.

Every educational institution, district, or state possesses some kind of information system, be it manual or computerised, formal and/or informal. Whether the information system is effective or not, however, is another question. In the management of education, what one can input into a system is often a matter of priority, and the challenge to any educational administrator in an organisation has always been the question of how to achieve goals with maximum efficiency, based on the information available. When properly managed ITEM could bring with it a number of benefits: better quality of information; saving of tim and effort; improved decision-making; better communication, and better control and utilization of resources. ITEM aims for effectiveness with higher efficiency.

2. A VISION FOR "ITEM"

Four levels or scales of development in ITEM can be discerned: the school/institution level, the district level, the state level, and the global level. ITEM innovations or practices at these four different levels can now be identified in many places around the world. The

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different presentations at this Working Conference spell this out and it is gratifying to see IFIP taking the lead towards a global ITEM vision.

2.1 An integrated approach to "ITEM"

The objectives and designs of ITEM systems vary of course at each different level, but it is important to have a holistic view in any ITEM design. The majority of early designs took a 'task-oriented' approach using the computer as a tool to tackle specific problems. This was, and still is, the situation especially for self-developed software in schools working in isolation. At a higher order, different departments of an organisation would computerise according to their own functions, usually resulting in a non-integrated system. With this 'functional' approach, sharing of information across departmental or administrative boundaries is virtually non-existent or limited, with individual departments keeping masterfiles often containing overlapping data.

To take full advantage of electronic data processing, it is necessary to design a total information system that will serve the whole institution or district and derive optimum outcomes. This integrated approach is comparable to town-planning for a city as opposed to individually designed houses.

Computerised information processing systems are useful because the volume of data they can process is large and the speed is fast. Usually many people are involved in the creation and use of the data. All of these people and all of their needs constitute the total system. 'Synergy' is perhaps the best word to describe the prime objective of a total integrated ITEM system, which demands that a holistic analysis be applied to the information needs. As Schure [1] puts it, this requires "... that there be a systems integration of all the available resource components, with the unique potentialities of every element aligned to produce a more effective system as a whole than any resource used singly."

Difficulties arise, of course, when such an integrated systems approach is put into practice. Due to the large amount of reorganisation and rethinking which must go into its design, it has been rarely implemented. But as more parties step into the popularization phase of ITEM, the cry for integrated systems and standardisation for schools within the same region becomes louder and clearer.

Integration and standardisation must not be equated, however, with conformity. While recognising the need for standardisation with central leadership in ITEM development using the integrated approach, school autonomy must be respected at the same time. Enough flexibility must be allowed for schools to maintain or develop their individual characteristics. Both school users in the periphery and office users at the centre must be able to perceive and enjoy the benefits from a successful ITEM system implemented on a regional level. Neglecting this critical factor will create unnecessary resistance from the system's potential users and may fail the ITEM innovation in the end.

2.2 A vision of "ITEM" across levels

In the 1980s computers entered schools to aid in a variety of administrative tasks. The next decade will be time for applying the machine to the level of supporting management. While Lancaster [2] distinguishes the higher level of application using the term 'Management Information Systems' instead of 'Administrative Systems', authors in the USA use the term 'Decision Support Systems' [3]. School administrators in the 1990s will be aided most likely

by the computer not only in routine administrative tasks, but also in all steps of the decision-making process, namely: problem identification, prioritising of criteria, data organisation, evaluation of alternatives, choice of an alternative, 'what-if' analysis, and implementation of school plans [3]. Besides management and administration, teachers will probably also be using LANS for curriculum management, assessment, counselling, and the like. These are the two internal senarios at the school level of ITEM.

At the regional level, it is envisaged that schools will be tele-linked to their regional education offices for data communication, to other schools for information exchange, and to universities, examination bodies, or even banks as in the Australian OASIS project [4]. It is not difficult to visualise such a network ascending to the state level and the global level. Technology is advanced enough already to support distributed-data-processing in LANs at schools which can link up to central education departments, as well as to telecommunicate with other schools at the international level such as in the AT&T Learning Circles.

Senge [5] talks about the "learning organization" as the successful organization of the future. Effective schools must also recognise the need to develop as "learning organizations" where learning takes place not just for students, but also for all staff members who are striving for continual development. Such schools within one region, when networked together for sharing and on-going improvement, form a "learning community". Towards this end ITEM has an important role to play across all levels in providing the networking environment for schools to communicate and share their experience, both within regions and globally. This kind of computer-mediated-support for international communication and understanding amongst teachers and students would much promote cross-cultural exchange.

3. "ITEM" INNOVATION AS A WHOLE PROCESS

In the broadest sense, any innovation would involve basically two phases: creation and development by a producer, and utilization by the client.

The creation phase is not necessarily sequentially separated from the utilization phase. User participation in evaluating and feeding back for improvement or modification during the development process is valuable in several aspects. The product developed will be of better quality and, what is more important, more likely to be accepted by the users. Besides, commitment generated by the involvement of the users will also much facilitate the change process. The SCHOLIS project in the Netherlands [6], as well as the SAMS project now under way in Hong Kong, both bear this out.

Concisely, the whole process of an educational innovation is the transition from its creation to utilization. During this transition period four subsystems are involved: the innovation subsystem, the producer subsystem, the user subsystem, and the change facilitate subsystem. Managing change in ITEM refers to the handling of interactions amongst these four subsystems during the innovation process.

3.1 Implementation, or assimilation?

'Implementation' is such a common and crucial term in innovation that any writer on the subject would find it almost impossible to avoid. In general terms, 'implementation' is the phase in the innovation process that follows the 'initiation' phase. The use of the term 'implementation' probably bears a close relation to the choice of the widely used term 'change

agent'. Both terms, however, unfortunately carry a misleading implication in the context of educational innovation management, namely that innovation is something that can be implanted into an organisation by some agent. This line of thought is then naturally followed by much concentration on resistance to change and ways of overcoming it. In such a classical perspective, 'change agents' are typically people employed by the management to 'implement' something new (and probably unwelcome) into the organisation.

In contrast to classical theories of change, current perspectives on 'change' simultaneously focus on five major areas: (1) change and excellence; (2) change as a learning process; (3) change and people; (4) change and culture, and (5) change and leadership [13]. A people-oriented approach appears to be more promising in managing innovations. With a phenomenological approach that emphasises meanings of the innovation to the actors concerned [7], there is a better chance of success. The primary role of a change facilitator system is to help people to 'learn through' the change process.

The literature shows that educational innovations often fail because they lack proper attention to implementation [8, 9, 10, 11]. The case of Cambire School is a classical example [12]. In the writer's view, lack of attention to implementation is only part of the story; lack of an understanding of 'how' is also a problem. In this regard, it is suggested here that the term 'implementation' is better replaced by the term 'assimilation' in describing the phase that follows initiation in the process of an innovation. Assimilation spells out more clearly the concept of an innovation being absorbed into a system, with a change facilitator system catalysing the process, rather than the traditional view of an innovation being implemented into an organization or a system by a change agent.

4. CASE EXPERIENCE WITH THE "SIX-A" MODEL

The Six-A process model for innovation was developed in a study of a regional ITEM case in London in 1986, followed by four school cases in Hong Kong [13]. Some major findings from these ITEM case-studies which form the core elements in the model are listed below:

1. Lack of ownership in, and commitment for success leads to participants' retreat when faced with problems.
2. Adaptation on the part of the organization and its people is unavoidable.
3. Innovation provides a learning experience for the participants.
4. A learning attitude is needed from participants to make it successful.
5. Training and support are crucial elements for successful assimilation.
6. Timely on-the-job training for ITEM is more effective than one-shot pre-service training; untimely training is a waste of resources.
7. "Theory-demonstration-practice-feedback" is a practical and successful training strategy for ITEM.
8. ITEM system-supervisors need problem-solving skills.
9. Understanding of the overall architecture of an ITEM system by the system operators will help to avoid major operation errors and thus increases the chance of success.

To be of value to practitioners a model has to be unavoidably prescriptive in a sense, providing a kind of reference guide for the change facilitator system to follow in the process of helping the user assimilate successfully the innovation system.

The main concern in this model is the utilization by individual schools of an ITEM innovation system created and developed externally, with a change facilitator system (either internal or external) managing the process. To avoid complications in discussing the model, the ideal situation of user-participation during the creation phase of the innovation is presently left out. The whole process of an innovation is a non-linear one and consists of re-cycling loops channelling through six broad stages as shown in Figure 1: (1) Awareness, (2) Attitude Formation, (3) Adoption, (4) Adaptation, (5) Action, and (6) Application.

These six "A" stages are in fact interrelated and overlapping, and can be grouped roughly into three main phases: the first being the initiation phase, including awareness, attitude formation, and adoption; the second being the assimilation phase, including adaptation and action, the third being the institutionalisation phase, including action and application. The cybernetic loops among the different stages indicate that these stages, although shown as discrete and sequential, are in fact 'interfering' with one another. For instance, trialing of an innovation will bring awareness and understanding about the innovation to a different level compared to that at the start. Different attitudes will also be formed as a result of trial which might affect decisions for subsequent actions.

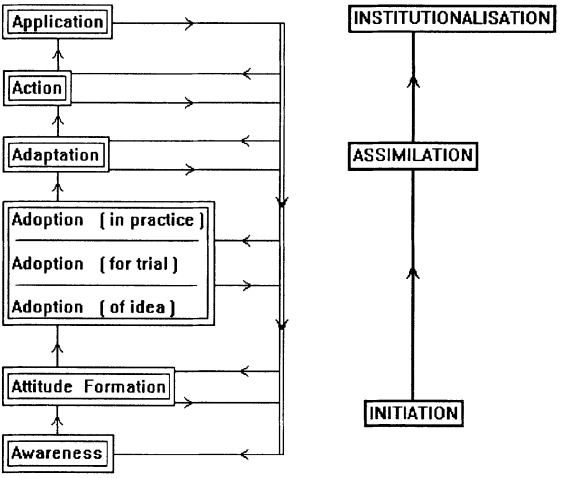

Figure 1. The Six-A process model

4.1 The initiation phase

The initiation phase is the transition from the state of knowing that an innovation exists to the state of making a decision of adoption (or rejection). During the initiation phase, the change facilitator should be working in a cyclic process involving awareness and attitudinal changes of actors participating in the innovation. The key feature of this phase is that it follows the "action approach" [14] or the "phenomenological approach" [7]. The meaning of

the innovation to the actors concerned, e.g., teachers and clerical staff in the case of a school innovation, is the working target of the change facilitator system.

To get to the stage of decision for adoption is the primary task before anything else can follow. In this regard, a change facilitator can consider taking the following strategy:

Step 1: Defining the 'Relevant System in Focus' - RSF.

Step 2: Searching and communicating information to raise level of awareness of RSF about the innovation.

Step 3: Building common grounds of worth for the RSF.

Even for innovations at the individual institutional level, the user system consists often of a large number of subsystems. It is impractical for a change facilitator to attempt to manage the entire user system as a single entity during the change process. Instead, it is more practical to define a span of focus at a certain time for a certain situation (or phase) during the change process. In other words, the change facilitator with a 'dynamic systems view' is situational in defining the system boundary with relevance to the objective(s) at different phases. People identified as key persons at different stages form the 'Relevant System in Focus' (RSF), i.e., the 'working system' isolated for attention by the change facilitator.

Any innovation will carry different meanings to different user subsystems. Dalin [15] has pointed out that whether an innovation is beneficial or not depends on the answer to the question 'to whom?'. It is argued that successful assimilation requires that relevant subsystems see some worth of the innovation from their standpoint at this initiation phase of the change process. The major task of the change facilitator at this stage is to help merge the initial incongruent sets of goals brought into the user system by various actors, or make overlaps amongst them as much as possible.

RSF with Incongruent Needs/Purposes of Representative Actors ----------> **RSF with Overlapping Needs/Purposes of Representative Actors**

Figure 2. Merging of innovation goals

The term awareness used in this context includes information, knowledge, and understanding of the innovation system on the part of the RSF. Different levels of awareness will lead to different attitudes of the actors concerned, subsequently leading to adoption or rejection of the innovation, as well as to different degrees of ownership of it. The role of the change facilitator system during the initiation phase is one of transmitting knowledge, raising concern, and communicating information among the subsystems in the RSF. The provision of information about the innovation system to the participants is particularly important at this stage. Hurst [10] suggests that information about the innovation system to be communicated would include: relevance or desirability, effectiveness or reliability, feasibility, efficiency, trialability, and adaptability.

During the initiation phase, it can be said that the bias or concentration of the change facilitator system is more on knowledge than skills and support. For the assimilation phase, however, the emphasis would be on skills training and support rather than on basic knowledge about the innovation system.

The stage of adoption marks vaguely the beginning of the assimilation phase. For major changes, it is simply sensible and natural to assimilate the new 'thing' by adopting on a trial basis before adopting for real practice. Thus adoption of an innovation may be sub-divided

into three levels:

(1) the lowest level (level 1) is the adoption of an idea about a certain innovation, with a decision to search for more information, knowledge, and understanding for further consideration,

(2) level 2 is the adoption of the innovation on trial and marks the beginning of the assimilation phase,

(3) level 3 is the adoption of the innovation in practice -- with the gaining of enough confidence, knowledge and skill, the innovation is put into action in real practice.

For large and complex innovations, adoption for practice is usually preceded by pilots or trials. This is a more secure way to step into the unknown without risking too much. In case the impact of the innovation on the user system is too undesirable or if the adaptation is too costly, the user system can still revert to its original state.

4.2 The assimilation phase

The assimilation phase includes adaptation and action by the user system. It is immaterial whether adaptation precedes action, or the reverse. Assimilation is a cycle of events after the user system has adopted the innovation for trialing. It is in essence a phase of experimentation for the user system. When the innovation is used in the real life situation within the organisation, reactions or feedbacks from different subsystems within the organisation will lead to two kinds of adaptation possible:

(1) adapting the innovation to meet user system requirements, i.e., tailoring or modifying the innovation system to meet the organisation's need, and

(2) adaptation on the part of the user system to suit the innovation system, i.e., modifying existing subsystems within the organisation (such as structures, tasks, habits, etc.) to achieve compatibility with the innovation system.

These two kinds of adaptation are not mutually exclusive and often both are required together. In other words, effort is required to manage the relationship between the target of change and the other sub-systems of an organisation.

It is worth mentioning perhaps that feedbacks during the assimilation phase are not limited only to the adaptations and actions taken. In effect the degree of awareness and attitudes of people in the user system are also unavoidably affected as a result of assimilation. Thus the whole process of innovation is an interrelated one, although a breakdown of it into component stages is required for discussion here.

The role of the change facilitator during this phase of the change is one of training, support, and problem-solving in practice. The prime objective is to help and guide the user system in assimilating the innovation, i.e., in getting accustomed to using the innovation, gaining confidence and achieving with it. With enough experience and learning through action while using the innovation system, the innovation can be fully applied with confidence.

The present author shares the view that commitment of potential innovation users is necessary and that their perception of the overall benefits of changing is essential. This is what the initiation phase in an innovation process is all about. However, it is argued that willingness to change is one thing; whether the potential innovation users are able to do so is another. This last question is exactly what assimilation should address. During the assimilation phase of the innovation process, potential users need to become effective users of the innovation. Training and support for the parties concerned are most crucial to overcome general feelings of insecurity and temporary incompetence during this period of uncertainty.

In school-based innovations, acquisition of technical skills and subsequent transfer to the workplace on the part of school staff is the prime objective of the assimilation phase. In this regard, the theory-demonstration-practice-feedback approach of Joyce & Weil [16] in training teachers to learn a teaching repertoire has much to be borrowed. While recognising that there are quite a number of formulations of training elements, these authors have identified this four-step approach, working in an adequate time frame, to be both necessary to, and adequate for the development of job-related skills in most vocations and professions.

4.3 Institutionalisation

With successful initiation and assimilation, people in the user system will be able to master the skills required for the innovation with confidence, gaining the full, intended benefits of the innovation. The innovation will be no longer something new to the organisation, and the application of it will become a matter of routine. In other words, the innovation will have been incorporated as a subsystem into the organisation and thus the assimilation phase reaches a sustained stage. This end state of the innovation process is the stage of application, when the mission of the change facilitator system is accomplished. Institutionalisation is then said to be reached, marking the end of the whole innovation process.

5. CONCLUSION

Undertaking an educational innovation is much like an adventure. Time and effort needed on the part of all participants as learners and adventurers are naturally much more than what is required when joining a packaged tour. For a better chance of successful educational innovation, the author is of the opinion that such investments are unavoidable. Ironically that is what makes the journey more rewarding to the committed team members.

The "Six-A" innovation model was developed from the theory that innovation is a learning process and not just an event, as Fullan [7, 17], Beckhard & Harris [18], Turrill [19], and many others have advocated. The author would like to add just one last remark about the learning element during an educational innovation process. While learning to develop the skills to handle an innovation system (for example, operating an ITEM software) is necessary for specific innovations, this alone is limited in scope. What is more important is the simultaneous development in the participants of a capacity for change, and also of their understanding of innovating, i.e., generating a developmental culture in schools, as Reid et al. [20] have said. Once leaders and participants in educational innovations understand and accept that change is a learning process on their part, they are more likely to appreciate subjective attitudes about an innovation; more likely to change their attitudes; more likely to commit their time and effort; more persevering in problem-solving; and thus more likely to keep improving continuously both themselves and their schools.

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