

Design, Implementation and Management of eLearning for TVET: Institutional perspective

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INTRODUCTION TO THE WORKSHOP: GOALS AND METHODS

The use of educational technologies and especially e-learning systems for Technical and Vocational Education and Training (TVET) offers some unique opportunities for innovation but also poses some special challenges for the system designers, developers, implementers and managers. Among the opportunities are use of emerging technologies for enhancing interaction between the learners and the content, the teachers and each other. The challenges, especially in the case of ODL delivery of the training programme, include the provision of adequate and authentic practice opportunities of tasks that involve interaction with tools, equipment, people, plants, animals and organizational situations in real world localities where the real work is performed.

This workshop will address the planning and implementation of projects that effectively exploit the opportunities for improved and more flexible learning offered by the use of specific technologies, and also how to efficiently manage the challenges of learning practical skills at a distance. The overall goal of the workshop is to explore the factors that typically lead to success or failure of technology-based innovations in education, with special focus on TVET projects and on the institutions that run them. The workshop participants will collaborate on the design of a model for the conduct of educational innovation projects which, although based on case examples taken from the TVET context, may also be applicable to any other educational institution context.

The workshop's methodology will be based on a "systems" – or "systemic" – approach that integrates the macro and micro planning aspects of educational innovation projects. Although in overall theoretical terms the approach will consider all operational levels of decision making and resultant action, from top management's strategic planning to ongoing technical support of installed equipment, special emphasis will be given to decisions at the institutional level – how to select, organize, develop and maintain/support the necessary resources (hardware, software and, most importantly, "peopleware") which are required to implement and execute the project.

The workshop activities will involve analysis, evaluation and discussion/reformulation of a set of "rules" – perhaps better thought of as "**recommendations**" – for the organizational structure of a system for the design, development, implementation and management of technology-based training projects. These rules/recommendations are based on the author's practical experience of technology-based-training project implementation via ODL, in several countries in both the developed and developing world. Specific examples used in the workshop will be drawn from work performed by the author at TVET institutions that are involved in COL's INVEST-Africa initiative, namely Auchi Polytechnic in Nigeria and the Instituto Superior Dom Bosco in Mozambique.

The remainder of this outline is intended to serve as an initial working paper, which will be used to introduce and guide the workshop activities. It is composed of two parts: a list of 15 recommendations; a suggested organizational model which attempts to implement them.

AN ODL MANAGEMENT SYSTEM AND STRUCTURE: 15 RECOMMENDATIONS

R.1. Think systemically throughout the process, using the CIPP model as a guide.

The essence of a systems (or systemic) approach to project design, implementation and management is that it clearly defines what is intended to be achieved (outputs, outcomes or products), how it may best be achieved (processes) and what it will take to achieve it (inputs). Furthermore, this “picture” of the system one plans to implement should be “framed” by a clear analytic (and also systemic) view of the wider system (environment, or context) in which the new system will be embedded. The essence of this is captured in the acronym that describes a powerful methodology of project and programme evaluation: CIPP (Context; Inputs; Process; Products).

R.2. Invest in strategic plans and use them for M&E.

The strategic planning process and the resultant documents should clearly define the activities, outcomes, responsibilities and target dates in a “systemic” manner, so that the plan may become a tool for the monitoring and evaluation of progress. It should include a “logical framework” (or similar control document) to later be used to Monitor and Evaluate (M&E) the implementation of planned activities in a “systematic” manner, firmly based on the CIPP evaluation model.

R.3. New technologies have to be integrated into the system and their impact evaluated.

A Technology Integration and Evaluation (TIE) unit or committee should be formed to help in planning, promotion and management of activities and initiatives that implement technology enhancements and educational innovations. This committee should also be responsible for publicity and promotion of the innovations, motivation of staff to participate in them, evaluation of their success and long-term impact, and formal reporting to management.

R.4. Invest in IDD&E.

The central support staff should be reinforced in the area of Instructional Design, Development and Evaluation (IDD&E) skills and competencies, which are essential to effectively plan and implement training for academic staff in the skills of competency-based-training, modularization of courses and effective use of new educational technologies. This should be implemented in the form of a Continuing Teacher Professional Development (CTPD) activity, through a blended system of online/off-line learning resources and practical projects.

R.5. Pedagogy improvements should lead technology innovations.

In addition to training in skills related to instructional design and technology integration, the proposed continuing teacher professional development (CTPD) system should also address the broader needs of academic staff who, in the context of TVET, often lack formal teacher qualifications or have not had any technical teacher training. This could be a collaborative project with other TVET institutions.

R.6. Make sure that tactics are in alignment with strategies and policies.

The Strategic Planning and Evaluation (SPE) unit or committee (first mentioned in recommendation R.1) should also address the challenges of influencing and impacting both local (Polytechnic/Community) and external (regional/national) policies and strategies regarding excellence in teaching and learning, competence in implementation and management of educational innovations and provision of adequate and reliable electricity and Internet infrastructure and services.

R.7. Look proactively for new technological opportunities.

The Technology Integration and Evaluation (TIE) unit (first mentioned in R.3) should undertake the systematic evaluation of new tools and technologies on the market to identify those that are compatible with the strategic plan, with the objectives of specific courses, and with the existing, or planned infrastructure. This unit should also study recent technological developments which show potential promise for TVET (such as, for example, cloud-based and mobile computing) and evaluate their potential impact on future institutional decisions on technology integration.

R.8. Look proactively for already existing learning resources.

The Instructional Design, Development and Evaluation (IDDE) unit (first mentioned in R.4) should help all academic departments to plan and implement conventional, on-line, and also “blended” courses in which teachers manage a multimedia library of online presentations demonstrations and simulations - mostly low or no cost “Open Educational Resources” (OER) – and support student learning from these resources through a blend of campus-based and Internet-based practical application exercises, assignments and assessments.

R.9. Plan for the efficient maintenance of installed resources.

A Technology Support Services (TSS) unit – probably formed on the basis of existing ICT services staff – may need to be strengthened, better equipped and have its role expanded so as to better handle the tasks of keeping the existing technical and technology infrastructure fully operational, even under any adverse external conditions (e.g. regional / national infrastructure deficiencies).

R.10. Plan for effective use of installed resources.

The Technology Support Services (TSS) unit (first mentioned in R.9) should provide not only hardware and software installation and maintenance services, but also support the end-users of the technology tools. This should include training in the use of new software apps and also ongoing technical support and production assistance in areas such as computer graphics, multimedia, audio and video recording, editing and production, etc.

R.11. Invest in the IDD&E of CTPD.

The previously mentioned Continuing Teacher Professional Development (CTPD) activities to develop general teaching skills and also specific educational-technology skills of importance for the technology integration goals of the Polytechnic and INVEST-Africa, should be planned and evaluated by the Instructional Design, Development and Evaluation (IDDE) unit and implemented through a blended system of online/off-line resources.

R.12. Invest in a multidisciplinary team approach to TVET design and development.

The Instructional Design, Development and Evaluation (IDDE) unit, in addition to the tasks previously mentioned in R.8 and R.11, should work in collaboration with academic staff from any department on all projects involving the design or re-design of learning materials, courses or whole programmes of study.

R.13. Invest in a multimedia approach to TVET.

The planning and preparation of other media, as for example “instructional” radio programmes, should be seen as part of a “blended” approach to the effective and efficient use of media and technology to enhance teaching and learning. It should therefore also employ a course-design-team approach that involves instructional design specialists and radio recording/editing experts as well as the academic staff from the specific subject matter area.

R.14. Work collaboratively with other institutions.

The institution’s actions to integrate instructional design competency, as well as teaching competency, within the ranks of its human resources may best be implemented through innovation-projects planned and implemented in collaboration with specialists from outside, through partnerships with centres of excellence, or through joint work on a “blended” CTPD system with other institutions.

R.15. Remember that change agents also need incentives

Finally it is recommended that the institution set up a challenge fund, or some similar form of incentive, where teachers can write a course or materials development proposal and apply for funds to design, develop and implement the innovation. Funds would be awarded in a competitive manner. The proposals should be prepared not by individual staff members but by a team that includes the three elements of expertise: subject matter; relevant technologies; instructional design. This would build capacity across the board, direct funding to worthy course development, and help to implement the earlier recommendations, including the use of a team approach.

CONCLUSION: IMPLEMENTING THE RECOMMENDATIONS AS A SYSTEM

The block-diagram in the table below integrates the recommendations included in this document in the form of a proposed model for central planning and support services at the institution.

Table 1. A Central Support & Services System for a TVET institution

THREE LEVELS OF A CENTRAL PLANNING & TECH-SUPPORT SERVICES SYSTEM	SUB-SYSTEMS TO DESIGN, DEVELOP & EVALUATE CHANGES & INNOVATIONS	SUB-SYSTEMS TO IMPLEMENT & TEST PLANNED CHANGES & INNOVATIONS	EXPECTED SHORT & MEDIUM-TERM BENEFICIAL OUTCOMES
1. Institutional: - Policy; - Strategies; - Organization; - Partnerships; - Funding, etc.	<u>SPE</u> <div style="border: 1px solid black; padding: 5px; text-align: center;">Strategic Planning & Evaluation</div>	<u>ORD</u> <div style="border: 1px solid black; padding: 5px; text-align: center;">Organizational Research & Development</div>	Institutional effectiveness; Inter-institution collaboration; Contributions to research/ practice.
2: Instructional: - Curricula; - Courses; - Lesson plans; - Media/materials; - Workshops, etc.	<u>IDDE</u> <div style="border: 1px solid black; padding: 5px; text-align: center;">Inst. Design, Development & Evaluation</div>	<u>CTPD</u> <div style="border: 1px solid black; padding: 5px; text-align: center;">Cont. Teacher Professional Development</div>	Increased teaching effectiveness; Improved learning results / pass-rates; Enhanced image of the institution.
3: Infrastructure: - Teaching tools; - Technologies; - Logistics; - Maintenance; - User support.	<u>TIE</u> <div style="border: 1px solid black; padding: 5px; text-align: center;">Technology Integration & Evaluation</div>	<u>TSS</u> <div style="border: 1px solid black; padding: 5px; text-align: center;">Technical Support Services</div>	Increased teaching/ learning efficiency; Cost-effective use of resources; Full benefits from new technologies.
The multi-level, iterative model underpinning the proposed system	<pre> graph TD A["(RE) DESIGN"] --> B["(RE) DEVELOP"] B --> C["IMPLEMENT"] C --> D["MONITOR"] D --> E["EVALUATE"] E --> A </pre>		

In the two middle columns of the table, the six services units that have been mentioned in the recommendations are organized according to their main functions (mainly planning/evaluating or mainly implementing/testing) and according to the level at which they operate (institutional, instructional or infrastructure). This visual organization illustrates how the six units are interrelated and how they should interact – as six sub-systems of an integrated system of central services. The following paragraphs summarize the main aspects of this system.

Strategic Planning and Evaluation (SPE).

This was first mentioned in **R.1**, where it was suggested that a **strategic planning unit** should, on a continual or periodic basis, undertake the task of revising the strategic plan in order to better address the needs and aspirations of the institution, its faculty members and the community which it serves. Then, in **R.2**, it is suggested that this unit should develop the strategic plans in a “systemic” manner, so that the plans may become effective tools for the monitoring and evaluation of progress towards institutional goals. Finally, in **R.6**, it is further suggested that this strategic planning unit should also address the challenges of influencing and impacting regional and national policies and strategies regarding excellence in teaching/learning, competence in implementation and management of educational innovations and provision of adequate and reliable basic infrastructure and services.

Organisational Research and Development (ORD).

It was suggested in **R.14** and **R.15** that any TVET institution should take the necessary actions to integrate the development of instructional design competency, as well as teaching competency, within the ranks of its human resources, and that this may best be implemented through carefully planned and monitored innovation-projects. This implies a research and development (R&D) function. It is envisioned that this function, in addition to the academic research which is typical in educational institutions, should also include **action research** specifically focused on the instructional development of better courses and course materials and also on the **organizational development** of the institution itself.

Instructional Design, Development and Evaluation (IDDE).

In **R.12**, it is recommended that a TVET institution should set up a services unit devoted to systematic, research-based, design and development of curricula, courses and the media and materials required to implement them. This unit should also undertake the systematic evaluation of ongoing courses and existing teaching techniques and tools, in order to identify and address any needs for re-design. This is seen as a central design/development/evaluation support team, the members of which will work collaboratively with academic staff from any of the schools and departments on ongoing projects involving the design or re-design of specific courses or whole programmes of study. Furthermore, in **R.13**, it is suggested that this collaborative approach should be applied to learning systems employing any form of delivery media. For example, the preparation of instructional radio programmes should also employ a course-design-team approach that involves specialists in: instructional design, development and evaluation; radio recording/editing techniques and technologies; academic staff from the specific subject matter area. This suggested “course-design-team” approach is similar to that which has been the basis of the success and internationally recognized quality of the courses and teaching procedures of institutions like the Open University of the UK and many leading universities and technical education institutions in the USA and elsewhere.

Continuing Teacher Professional Development (CTPD).

In **R.4**, this workshop recommends a continuing programme of teacher professional development for academic staff in areas such as competency-based-training and modularization of courses and in the effective use of new educational tools and technologies. In **R.5**, it recommends that the proposed programme should also address the broader and more fundamental needs of staff members who not only lack formal teacher qualifications, but have not had any prior technical teacher training. In **R.8**, it is suggested that the proposed IDDE unit should be responsible for the planning and the evaluation of this CPDT programme and, in **R.11**, it is recommended that the TVET institution should set up a permanent services unit to implement and manage the proposed continuing teacher professional development (CTPD) system.

Technology Integration and Evaluation (TIE).

In **R.3**, this workshop recommends that a technology integration and evaluation task-force, or unit, should be formed to plan, promote and manage all initiatives that intend to integrate new, technology based, enhancements and innovations into the teaching-learning systems of the Polytechnic. In addition to planning whether and how to implement new technologies, this unit will also handle the dissemination of information about available new technologies, motivation of staff to participate in their use, and evaluation of their impact on teaching and learning at the institution. In **R.7**, it is further recommended that this

Technology Integration and Evaluation (TIE) unit should also perform systematic “proactive” evaluation of the potential of new tools and technologies that appear on the market, in order to identify those that are compatible with the institution’s mission, policy and strategic plan, with the objectives of specific courses, and with the practical capabilities of the existing (or future-planned) infrastructure.

Technical Support Services (TSS).

In **R.9**, it was recommended that a Technology Support Services (TSS) unit – formed on the basis of existing ICT and other technical services staff – should be strengthened, better equipped and have its role expanded so as to better handle the tasks of keeping the existing technical and technology infrastructure fully operational, even under adverse external conditions of regional/national politics, resources or existing infrastructure. Furthermore, according to **R.10**, the TSS should provide not only hardware and software installation and maintenance services, but also technical support to the end-users. Its services should include the provision of initial training (as part of the CTPD service) in the use of new software app’s and also ongoing technical support and production assistance in areas such as computer graphics, multimedia, audio and video recording, editing and production, etc.

FINAL WORDS.

As a form of “bottom line” to the recommendations presented above, this workshop stresses that the proposed services units should be integrated so as to interact with each other “systemically” towards common goals. Some of the component “bricks” needed to construct such a system (e.g. SPE, TSS) may already exist in a given TVET institution, but they may need to be strengthened and reorganized. Other suggested components (e.g. IDDE, TIE) may not currently exist and may have to be “built from scratch”. In order to build the proposed structure of **Institutional, Instructional and Infrastructure support** , the institution must first prepare a “blueprint” of the desired system. The structure presented in Table 1 and described in this paper is presented as a first step in the preparation of this blueprint. The workshop activities will build on the experience of the participants to review and revise the model proposed here, possibly adapting it to the specific characteristics of institutions which the participants represent.