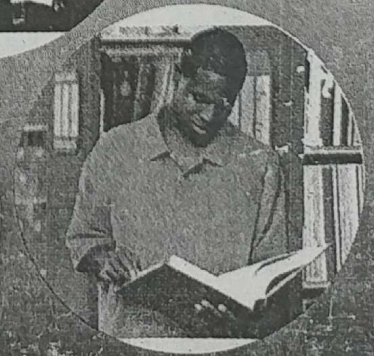
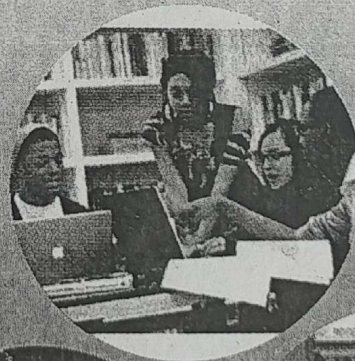




Quality Assurance & Productivity Unit  
**FEDERAL UNIVERSITY OF TECHNOLOGY  
MINNA, NIGERIA.**

# **TRAINING MANUAL**

*for*  
**WORKSHOP ON  
EFFECTIVE TEACHING,  
LEARNING AND RESEARCH**



Date: 3rd Sept. - 4th Oct. 2012

Venue: Bosso and Gidan Kwano  
Campus, Minna.

Time: 9:00am - 5:30pm Daily

# WORKSHOP ON EFFECTIVE TEACHING, LEARNING AND RESEARCH IN FUT MINNA

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## Introduction

One of the cardinal objectives of this University is to train qualified graduates that can meet up with the requirements of the employers worldwide using top quality world-class academic staff. In his effort to improve the quality of academic staff, teaching, learning and research in FUT Minna, the Vice-Chancellor approved that a 3-day Intensive workshop on *EFFECTIVE TEACHING, LEARNING AND RESEARCH* be organized for all the Schools in the University. The programme intends to provide theoretical and practical ideas on the fundamental aspects of pedagogy with focus on teaching, learning and research development, as well as ethics of teaching profession for the purpose of achieving the University's mission and vision on quality teaching, learning and research.

## Objectives

At the end of this workshop, participants should be able to:

- Identify different concepts of and approaches to learning taken by student
- Explain some key elements of course design and development.
- State learning outcomes effectively
- Explain the principles and significance of assessment/feedback
- Discuss the skills required in small and large group teaching.
- Conduct successful peer teaching, observation, and course evaluation.
- Apply various strategies for effective classroom management and emotional intelligence.
- Identify and apply different new technologies for maximizing literature searching.
- State the importance and components of research writing, multidisciplinary research, effective postgraduate supervision and Mentoring activities.

## Workshop Session and Evaluation

The 3-day workshop is an intensive programme that will provides theoretical and practical ideas on the fundamental aspects of pedagogy with focus on teaching, learning and research development for the 6 schools in the University. The workshop components are divided into 11modules. The workshop sessions involved:

- i. Presentation of modules by resource persons
- ii. Activities for the participants (class tasks, homework etc.)
- iii. Group discussion and observations
- iv. Evaluation of participants

## Workshop Kits

- i. Workshop Training Manual
- ii. Workshop Folder
- iii. Writing pad
- iv. Workshop CD
- v. Stationaries (Pencil, Biro, Erase and Sharpener)
- vi. Certificate of Participation

## Acknowledgments

We wish to sincerely appreciate the effort and kind gesture of the Vice-Chancellor and management of the Federal University of Technology Minna, Nigeria for the given opportunity to enhance teaching, learning, research skill and best practices in the academia through full sponsorship of this workshop. Our appreciation wouldn't have been completed without acknowledged the moral support of the registry department for logistics support.

Our gratitude also goes to the management of Petroleum Training Development Fund (PTDF), Nigeria under whose umbrella some staff (Dr. Abdulfatai Jimoh

and Mrs. Muibat D. Yahya) of the University were opportune to be trained under the “train the trainer” ULSETP (pedagogy training) sponsored by the Fund. Some of the materials used in this manual were extracted from ULSETP training materials used while on study. It is our hope that this manual would serve as a base for further enquiries into enhancing teaching and learning in our academic environment (FUT Minna).

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## **MODULE 8: TEACHING IN THE DISCIPLINES**

### **Introduction**

This presentation is aimed at introducing the notion of teaching in the disciplines. More specifically, the pedagogical knowledge needed to present the various ideas and materials related to teaching and learning in higher education (University). A model for linking generic knowledge of teaching and learning with specific discipline pedagogy is here presented. This is to enable you deal with the entire tools related to teaching in your discipline. One way to grow as a disciplinary specialist is to fuse the various dimensions and relationships in order to improve on your teaching expertise.

It is equally very important to note that, because there are wide areas of specializations, there will also be many methods of knowledge presentations for meaningful learning to take place. Each method of teaching has its strengths and limitations. However, the versatile University Lecturer will select a pedagogical approach that will be appropriate to a particular context or content presentation. The adoption of any method will depend on the objectives intended to be achieved at the end of the class.

### **Learning Outcomes**

It is hoped that after this presentation, you will be able to:

1. Explain the concept of "discipline-specific pedagogical knowledge" (DPK).
2. Identify and describe the dimensions and components of a DPK model
3. Determine the various methods of teaching
4. Identify the strengths and limitations of the method peculiar to your area of specialization.

### **Teaching as a Profession**

Teaching at all levels of education in Nigerian has become an all-comers profession. All manner of people go into it without the requisite professional training. Teaching in higher Institutions (University) of learning is under taken by people who are specialist in their areas without the principles and practice of teaching. University teaching staff are often left to develop understanding of teaching and learning on their own. The question is, how does the University teacher become an effective teacher? More so that, teaching in higher education has to be discipline specific taking into account specific characteristics. It

therefore means that, developing teaching skills alone is not sufficient to become an effective teacher in higher education. One must also develop the understanding and requirement of his own discipline. This is termed discipline-specific pedagogical knowledge (Lenze, 1995; & Bethiaume, 2007).

Another way university the lecturer gains pedagogical knowledge is through accredited academic practice program for new lecturers' and through continuing professional development in one's disciplinary knowledge. In such scenario, the University lecturer remains a disciplinary specialist who knows how to teach and foster learning in his field.

### **A MODEL OF DISCIPLINE SPECIFIC PEDAGOGICAL KNOWLEDGE (DPK)**

In the field of educational research, the notion of DPK has been examined with two distinct traditional lines of research (Heather, Steve & Marshall, 2009):

1. Research on the knowledge base for teaching (Hebert, Gallimore and Stigler, 2002, & Munby, Russell and Martin, 2001).
2. Research on disciplinary specifics in University teaching (Becher and trawler, 2001; Neumann, 2001; Donald, 2001).

Within research on knowledge base for teaching, three distinct components have been found to play crucial role in guiding the academics. These components include:

1. The teacher knowledge about teaching (the relative consensual, cognitive understanding that informs skill teaching and the body of dynamics)
2. Beliefs relating to teaching which are mostly personal, untested assumptions, premises or suppositions that guides teaching actions and
3. Goals' relating to teaching which the teacher tries to accomplish as expectations and intentions about instruction which may be short or long term.

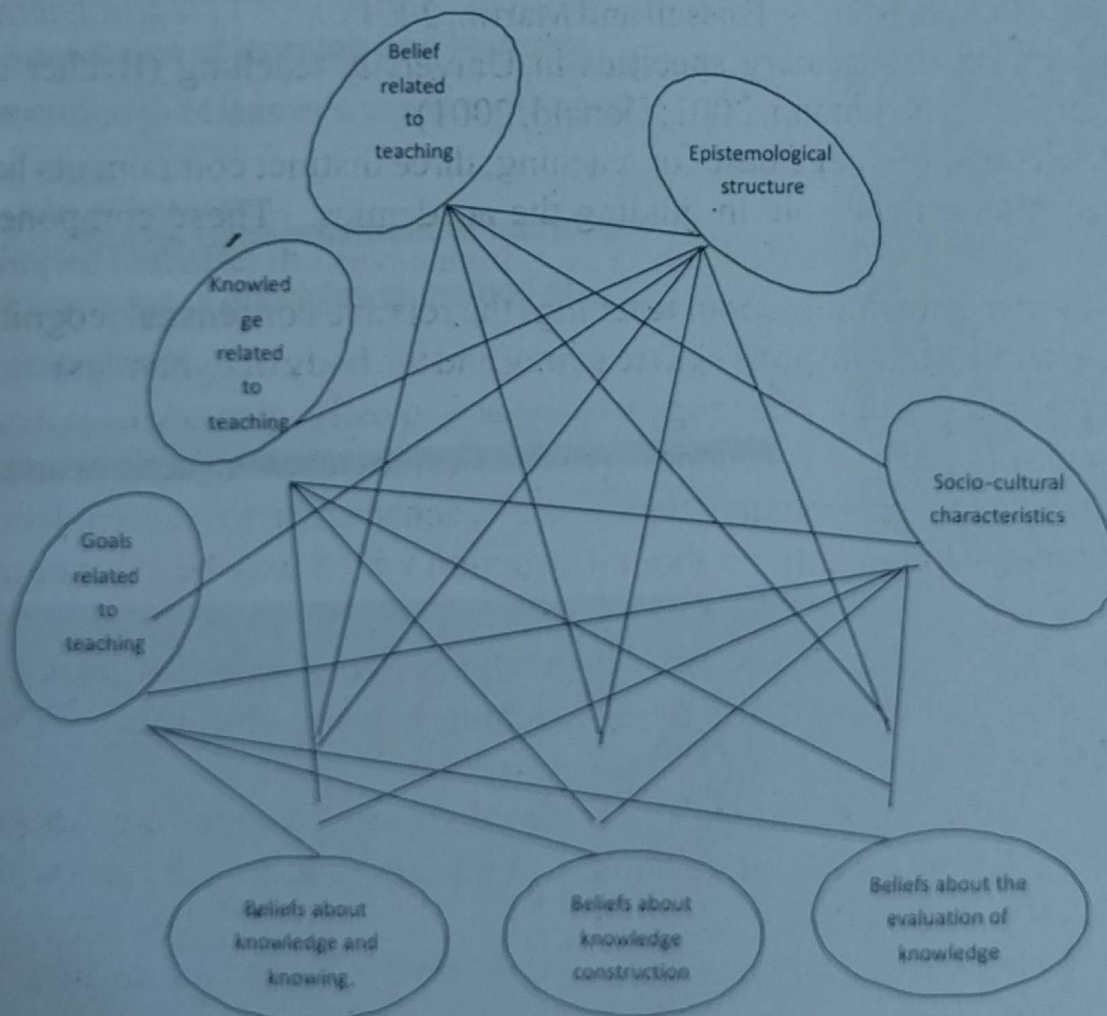
Within research on disciplinary specificity; two types of characteristic have been found to influence what one does when teaching a given discipline. These characters include:

1. Social-cultural characteristics of the discipline which are socially constructed through the establishment of morals, practices or rules within a group of individuals
2. Epistemological structure of the discipline which determines how the field is instructed.

Yet each of these lines of educational research is limited in its ability to represent the notion of DPK in its full complexity. However, linking the two lines together enables us to examine the phenomenon of DPK and knowledge base teaching with elements of discipline specificity which provides a way to consider internal and external factors contributing to the formation DPK.

The empirical model of DPK is presented in figure 1 below. The model has included elements from a third source, namely the teachers' personal epistemology which are his belief about knowledge and its development ( Baxter-Magolda, 2002). The model of DPK presented incorporates the three lines of research identified above. In this presentation, the DPK University teacher develops complex relationships between the various components coming from these sources.

**Figure 1: Model of discipline-specific pedagogical knowledge (DPK) for University teaching**



(Source: Hearther, Steve & Marshall, 2009 )



## DIMENSIONS ASSOCIATED WITH COMPONENTS OF THE KNOWLEDGE BASE FOR TEACHING

### COMPONENTS

1 Goals related to teaching  
(Expectations and intentions of the teacher that may be long or short time)

### EMERGING DIMENSIONS AND DESCRIPTION

- **Course level goals;**What the teacher wants to achieve during the course?
- **Class – level goals**  
What the teacher wants to achieve after a given class.
- **Ordering of goals.**  
The precedence of goals for a particular course class programme.
- **Accomplishment of goals**  
The attainment of the teachers goals in the course class levels
- **Future goals:**  
Goals arising after the course or class.
- **Knowledge of content:-** Knowledge of the discipline
- **Pedagogical Knowledge:-** content knowledge of teaching specific aspects of the content.
- **Knowledge of self :-** Certain aspect of the teacher person that impact on teaching
- **Knowledge of learning and learner:-** Knowledge of learner's characteristic and actions.
- **Knowledge of assessment of learning:-** Knowledge of principles or method of assessment.

2 Knowledge needed for Teaching. (Body of dynamic and relatively consensual cognitive knowledge and Skills of teaching)

- **Knowledge of curricular issues:-**  
Knowledge of relationship between topics or course taught by colleagues.
- **Knowledge of human behavior:-**  
**Knowledge** of how human reactions may affect teaching and learning (group dynamics, Interpersonal relations non-verbal communication).
- **Knowledge of physical environment:**  
Knowledge of how physical arrangement or location effect teaching and learning.
- **Knowledge of logistical issue:-**  
Knowledge of how administrative bureaucracy effects/ impart on teaching and learning.
- **Teaching in the discipline:** - Norm's, conventions or rules that prevails among colleagues that teach same or similar discipline.
- **Learning in the discipline:** - Norm's, conventions or rules that seem to prevail among students' that learn same discipline.
- **Practicing in the discipline:-** Norm's, conventions or rules that guides practicing among colleagues or students' in the discipline.
- **Description of the discipline:** - The nature of the teacher's discipline about the level of complexity or difficulty
- **Organization of the discipline:** - How the branches/ sub – branches of the discipline evolves over time.
- **Relation to other discipline:** - How the discipline relates or compares to other disciplines.

### 3. Socio-Cultural

#### Characteristics:

(Establishment of norms and Practices that regulates individuals)

### 4. Epistemological structure; (Nature and organization Knowledge in the field)

5. **Beliefs related to teaching.** (Views of what constitution Knowledge and actions associated with being able to know).
- **Belief about the purpose of teaching:**  
The teacher's expectations directed at graduates
  - **Belief about the conditions for instruction:** Teacher's view on basic requirements for effective teaching in the University.
  - **Belief about teaching and teachers:-**  
Teachers' views about role and responsibilities of University teachers'.
  - **Belief about learning and learners:-**  
Teachers' views about the role and responsibilities of learners.
6. **Beliefs about knowledge Construction;** (Development and accumulation of Knowledge)
- **Beliefs about how students learn Learning and knowledge construction** applicable to individual
  - **Beliefs about how students learn specifically:** -Learning and knowledge construction that are specific to their discipline.
7. **Beliefs about knowledge Evaluation.** (Attributes of value)
- **Beliefs about the relative value of knowledge:** - Teacher's belief on the ordering of certain sources of knowledge.
  - **Belief about how to evaluate knowledge Teachers:** - Belief on relative importance of knowledge.

(Source:Hearther, Steve & Marshall, 2009 )

### Teaching Pedagogy in the disciplines

Teaching and learning is like the sides of a coin. The acceptable measure of quality teaching is the amount of learning that takes place. However, there is contention on whose measure of value is most acceptable. There is a strong link between the amount of learning and students rating of the lecturer. Those who learned well rate their lecturer high (Theall & Franklin, 2000). Doyle (n.d) opined that, teaching without learning is just talking.

Researchers have indicated that, students are the most qualified to report on which teaching method is productive, informative, satisfying or worthwhile. While students opinion may not be legitimate indicator of students satisfaction with teaching method, the use of such ratings for evaluating teachers exist in over 2000 articles and books written in the past 70 years (Sajjad 2012). He opined that Universities around the world adopt anonymous feedback ratings systems at the end of each course completed to rate instructors. Evaluations of instructors assist lecturer to further develop and improve on their teaching skills and administrators for personnel decisions (Ovy, 2000).

There are many teaching methods the University lecturer has at his disposal for effective knowledge presentation. The choice of any of these methods depends on certain critical issues that border on:

1. The extend of freedom for curriculum presentation
2. Employer involvement in course specification and delivery
3. Recruitment imperatives such as the plethora of disciplines and baccalaureate degrees to be awarded.
4. Widening access, participation, aspirations and differentiated learning environments.

### The Lecture Method

It is essentially a one-way transmission of information to students especially in a class with over 100 students. Sajja (2012) described the lecture as a talk or verbal presentation given by the teacher. With all the advancements in teacher training and computer technology, the lecture is still popular in University education. With adequate preparation, planning and presentation techniques, the lecture becomes a readily tool for transferring knowledge to students (Sullivan & McIntosh, 1996). Lecture gives students training in the act of listening, talking and rapidly taking notes (Kochlar, 2000).

### Assumptions for using the lecture

- The lecturer must be experienced and have proper mastery of subject matter
- Materials to be learnt must be stimulating and thought provoking
- Information's should be supported with memorable and rational examples
- Lecturers must stop and ask questions to involve students in the learning process to check comprehension
- PowerPoint's presentation can be used to reinforce the lecture
- Lecturers must provide separate notes at the end of the class
- Points must be explained clearly without ambiguity

### Discussion Method

It is free verbal exchange of ideas between the lecturer and students' group. For effective discussion, students must have a prior knowledge or information about the topic to be discussed in advance (McCarthy, 2009). Topic for the discussion should be on a problem, issue or situation on which already there is difference in opinion (Kochlar, 2000). This method is effective where students don't depend on rote learning (memorization of basic facts).

Discussion can be particularly challenging in sciences, applied science and engineering related fields which does not often always present obvious points for discussion where there is usually a single correct answer (Garratti, Overton & Threlfall, 1999). Designing open-ended or 'fuzzy' problem where there is no single correct can provide opportunity for multiple responses and no wrong answers.

### Assumptions for adopting discussion method

- The lecturer must spend quality time to prepare the objectives and steps for discussion
- Focused group discussion (FGD) should be used to discuss different aspects of a topic
- Sufficient time should be allotted to discuss an issue and conclusion drawn
- The lecturer must introduce the topic for discussion to participating students
- The lecturer serves as the facilitator and moderator of the discussion session
- Questions session should be included to give the discussion a direction

- The classroom environment must be made conducive to foster effective discussion
- Students' must listen to other participants view for adequate evaluation
- The lecturer must give value to all shades of opinion without necessarily overshadowing the debate

### **Problem Based Learning (PBL) Method**

PBL learning curriculum is organized around an identified problem. This type of learning approach relies on the problem to give direction to the learning process. PBL waits for the problem to be encountered before knowledge relevant to the solution are sort or acquired. This method is well established in medical laboratory sciences (Raine & Symons, 2005).

### **Assumptions for adopting PBL**

- Problem must be identified
- You must a deeper understanding of the subject matter
- Encourage independent and collaborative learning
- Develop higher-order cognitive skills
- Develop a range of skills, group working and critical analysis and communication skills.

### **Industrial Work Experience**

Employers of labour value work experience. Students industrial placement which is synonymous to students industrial work experience (SIWES) undertaken for practical experience for few months to a full year has been a feature of experimental science programmes. Students who return from industrial placement are generally motivated because they have developed a range of transferable personal skills and appropriate attitudes (Murray & Wallace, 2000). Engineering work-based learning (WBL) is also a sandwich placement that also exposes students to practical work experiences.

### **Assumptions for adopting Industrial Work Experience**

- The broad goal of the project has to be clearly stated
- Find placement for students through departmental contact system to provide best services to students
- Throughout the period of SIWES contact has to maintained with the student and organization

- If there are multiple assessors, there report has to be properly harmonized
- If the placement exercise

### **Use of Information Communication Technology (ICT)**

There is an increasing focus on the use of ICT in higher education. Virtual Learning Environments (VLEs) within institutions are means of dissemination, interaction and learning support systems. Computer has valuable potential with range of learning tools like PowerPoint presentation among others. The key question is “what is appropriate”. Any computer-based learning and teaching activity must be assessed according to its contribution to learning (Heather, Steve & Stephanie, 2009).

Simulations of experiments are example of how computer can be utilized by the University lecturer in all fields of human endeavor. Particularly in the laboratory practical, making mistakes in design and execution can be very costly and dangerous to be allowed. In reality, we are usually restricted by space, lack of reagents, and safety tools for experiments to be physically and financially achievable. The advantages of using computer simulations are numerous to include; reduced cost, broadening of the curriculum, access to real experiment and unusual equipment (Hughes, 2006).

### **Assumptions for using ICT Materials**

- A lot of time is needed for design and planning
- Organization of materials
- Ensuring that learning materials are interactive
- It should follow the inductive learning principle i.e. from specific to general
- The lecturer should be readily be accessible for further clarification when necessary

### **Case study**

This method is primarily used in business in business and law context. It can however be used productively in teaching liberal arts, engineering and education. This method is used to basically develop critical thinking ability and also problem-solving skills. Students are presented with a record of circumstances based on actual event or an imaginary situation and they are asked to:

1. Diagnose the problem

2. Come up ways or solutions to the problem
3. Give reasons or implications for the actions taken after providing solutions to the problems

This method is however time consuming and when it is inconclusive, insufficient information could lead to inappropriate result hence does not provide the real experience. At the end, students' would only want to know the real answer from the teacher.

#### **Roles of the lecturer:**

- Read the case and determine the key issue or problem
- Determine the data required for the synthesis into solutions
- Analyze and compare data for recommendation of action

#### **Assumptions for adopting Case Study:**

- Cases should be brief
- Well written
- Should reflect real issues
- Students should be small groups
- A report should be written at the end and formally presented to the class

#### **Practical Work**

Laboratory/practical classes and workshop play a major role in education especially in experimental science. In this learning environment, students develop professional skills and attitudes. Sciences are supposed to be practical subjects and practical experiences are vital and non-negotiable.

Practical work may be very strenuous to design and technical skills are needed for application of theory to practice. Graduates have made it clear that they are generally ill prepared for practical's to address employability (Brown, et al, 2005).

This may be because of reduced quantity and quality of practical work.

#### **Assumptions for Practical work**

- Produce the design
- Plan an experiment
- Make link between theory and practical
- Gather, manipulate and interpret data
- Make observations



- Form and test hypotheses
- Develop safe working practices
- Motivate and enthuse students'
- Stimulate professional practices.

Teaching methods are endless as the area will continue to witness evolution of newer approaches/pedagogies. Research will continue to unfold better strategies just like the slide projectors were <sup>over</sup> taken by PowerPoint's Presentations, teleconferencing etc. The following are veritable list of methods that the lecturer could use in advancing the frontiers of knowledge in his discipline:

1. Assignments
2. Seminars
3. Fieldtrip
4. Role-play
5. Brainstorming
6. conferences

### Conclusion

Lecturers should continue to evolve teaching methods that will match students learning styles/objectives. Our desire today is to spark some creativity in the way we teach while providing the basic resources which can be shared with others. Developing a variety of teaching methods will help build a learning community. The assessment teaching methods framework "plan, do, check and act" is supposed to be continues and when operated in a cycle could be adopted in higher education, industries, government agencies and business world;

1. Plan: - Concept you want to teach Strategy you intend to use

Materials needed for the teaching

Date and time to accomplish all the learning objectives

Feedback needed to assess the strategy

2. Do: - Execute your plan
3. Check: - Review students' evaluation reports
4. Act: - Decide what to do next either to stick to the method to change the method entirely.

As I end this presentation, I wish to say that you are a significant player in achieving "education excellence". Together as teachers' we can build a learning community that can make the required difference in our society.

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