Enterprise Innovation-Driven Apprenticeship:
A Suggested Programme

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Abstract

Apprenticeship or professional training is essential for every curriculum at the undergraduate level because direct experiences gained from on-the-job training are beneficial for students to prepare themselves for their future careers. Bridging the gap between theory or research and the real-world business context, apprenticeship plays an important role in the cultivation of talents for the creation of innovation. This article reviews the theoretical bases related to apprenticeship explained by Chickering's Theory of Student Development, Authentic Learning, Kolb and Experiential Learning Model and Practical Intelligence Model. On the basis of the relevant theories of learning, the author proposes a systematic and integrated model of apprenticeship 'Enterprise Innovation-driven Apprenticeship Programme', which is proven as a proper learning management system to support an innovation creation to the satisfaction of an enterprise. An example of a successful training is presented herein. The model of Enterprise Innovation-driven Apprenticeship Programme is a 16-week practical programme with explicit descriptions of how learning and application are developed within four phases of training, namely, Phase 1: Orientation and Adjustment of Trainees, Phase 2: Assignment Performance in Search of Creative Innovation, Phase 3: Proposal of Innovation-driven Project and Phase 4: Innovation Project in Action.

Keywords: Apprenticeship, Innovation-driven, Bloom's Taxonomy

1. INTRODUCTION

With regard to government policies 'Stability, Prosperity and Sustainability,' the 'Thailand 4.0' era is established as a model of national economic development with important missions in driving the country's evolution in many aspects. The vision is to become a 'value-based economy' or an 'innovation-driven economy' with a main concept of transforming from 'consumer products' to 'innovative products' and 'industrial-driven' to 'technology, creativity and innovation-driven economy' education is one of the major aspects to be developed because human resources contribute to the success of the country.

Therefore, the education policies in the 4.0 era aim for an educational revolution to drive the country towards the goals of social and economic stability, prosperity and sustainability by means of innovation creation and changing the role of population from being consumers to producers or entrepreneurs (Wittayasin, 2017).

The proper national vision on educational revolution is to establish a strong fundamental base since early childhood and everyone must be accessible to educational systems (education for all). Visionary learning management determines to change from passive learning to active learning. Not only a child-centred approach to help students understand lessons that include theories but also a creation approach must be applicable as an integration of knowledge from various sources and practical implementation. The means and goals of instructional management must be developed from 'learning for knowledge' (focusing on contents and thorough understanding lessons) to 'learning for creation' (focusing on the learning process, skill training, knowledge application, thinking and analysis and creation of tangible or practical pieces of work). The instructional and learning process is the key success factor in producing qualified and competent human resources, which contribute to the prosperous future of the nation.

Curriculum revolution must not be limited to the body of knowledge; the application process of learning management is the thing that encourages students to learn, research and enhance their experiences in different ways, particularly 'cognitive apprenticeship' (Dennen & Burner, 2008).

Designing proper learning management systems, which meet the vision of the country in the aspect of an innovation-driven society where future citizens have entrepreneurial characteristics instead of simply being consumers, is a challenging mission for instructors. The reason is that learning management systems must be able to encourage learners to go beyond classroom lessons and expand the body of knowledge from fundamental concepts, theories and principles in textbooks, research or lessons that are the bases of creativity for innovation. Therefore, learning management systems for every subject in classrooms must not only focus on 'remembering' and 'understanding', which are basic purposes of learning according to Bloom's taxonomy but also on encouraging learners to be able to 'apply' and 'create', which are the topmost goals expected from the learning management systems in Bloom's cognitive domain (Aheisibwe, Kobusigye & Tayebwa, 2021).

Given that learning management systems can influence learners' creativity and innovation and inspire them to become start-up creators or entrepreneurs of new products or inventions in the future, learning management systems play a major role in driving the educational system towards desirable goals. In this regard, learning management systems at all levels have to focus on human resource development (HRD), so that learners can apply the knowledge obtained from classrooms to create commercialised innovations.

The learning management system of higher education aims to produce manpower and develop manhood at professional or semi-professional levels. The professional education level requires six major characteristics as follows (Office of the Higher Education Commission, 2017):

1. Public service-minded and committed to the professions;

2. Having extraordinary body of knowledge and expertise;

3. Taking a certain period in apprenticeship and practice of the professional expertise;

4. Having freedom to make a decision within the responsible scope of work;

5. Having proper control over the professional licence issuance;

6. Having the professional ethics.

Learning management systems at the higher professional education level of every curriculum must include apprenticeship or the so-called 'on-the-job training'. Apart from the concepts and theories from the static classroom environment, learners must have an opportunity to practice and develop necessary skills required for becoming desirable graduates in such professions.

In connection with this requirement, the author aims to present major aspects of apprenticeship in proper learning management systems, which are essential for driving to the ultimate goals of human resource management and HRD. For an explicit understanding on the aspects and scope of activities of apprenticeship in every curriculum at the undergraduate level, various definitions of apprenticeship are shown in the illustration below (Figure 1) (Chiang Mai Rajabhat University, 2018; Jarunee, 2020; Kamphaeng Phet Rajabhat University, 2019; Kasetsart University, 2018; Sisaket Rajabhat University, 2018).

An essential activity in a learning management system to give learners a chance for practical training in the relevant fields of study, so that they can apply and develop the knowledge and skills whilst practicing in the actual environment.

Learning process for multi-skill exercises, that is, thinking skill, management and dealing with a situation in the workplace where the lessons learnt in the classroom can be applicable to achieve direct experiences by themselves.

Apprenticeship

The process of professional training in the relevant fields of study arranged by the university in collaboration with the related enterprises to enhance learners' professional skills theoritically and practically.

A pre-requisite course of study prior to graduation to give learners an opportunity for professional training to create good attitude towards the relevant professions and help learners realise their actual needs in their careers.
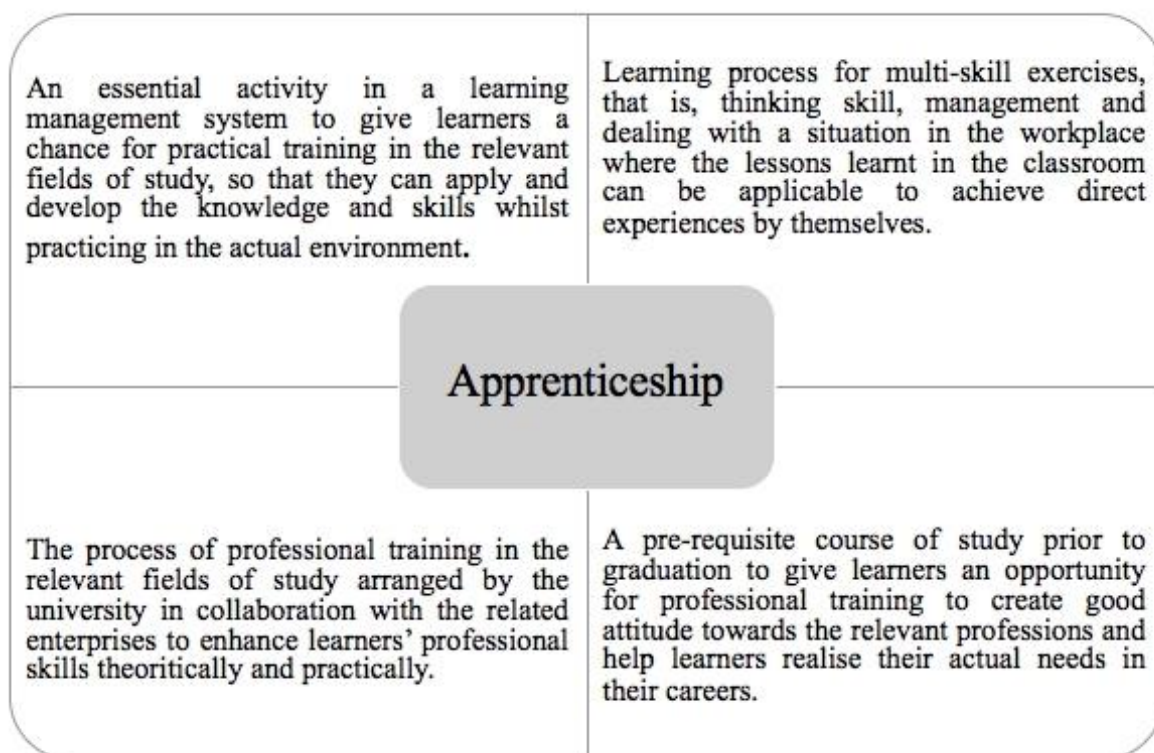
Figure 1: Definitions of Apprenticeship

Apprenticeship is a process by which learners learn from a more experienced person by way of cognitive and metacognitive skills and processes (e.g. assisting, providing support and examples). Apprenticeship, as an important factor of an action-based learning method, has been organised in many professional programmes in collaboration with related enterprises. Trainees also engage in social

entrepreneurship projects, work entrepreneurially within established organisations and help identify and package intellectual assets into more tangible innovation. Thus, apprenticeship focuses on the learning process and how to use theoretical and practical knowledge to reach the goals and thereby shaping learning methods by combining the intended curriculum and individual as well as organisations goals (Fjellström & Kristmansson, 2019).

Apprenticeship is evidently necessary for students at the higher education level to become desirable graduates in the future to have an opportunity to learn from real-life employment where management, venture creation and entrepreneurship are experienced and they will be able to put into practice the learned knowledge and theories. As trainees, they have to face real situations, which allow them to practice not only cognitive and psychomotor skills but also effective skill, all of which are the goals of learning. Moreover, those skill, such as problem-solving, decision-making, emotional self-regulation, reflection, creativity and innovation are also regarded as important skills which contribute to the win-win achievement of trainees and enterprises (e.g. optimum efficiency and the most desirable goal of innovation ventures by successful trainees).

2. THEORITICAL BASES OF APPRENTICESHIP

Apprenticeship emphasises linkages between learning concepts and theories from the classroom to the application of the knowledge gained into practice in a realistic environment. It is a preparation process to produce qualified graduates who can bring the body of knowledge to create innovations in accordance with their professions appropriately. Therefore, a proper curriculum should have the learning process programmes, which contributes to the development of knowledge, abilities, attitudes and skills that lead to the expertise preparation of students to enter the labour market.

Relevant concepts and theories are the basic principles in designing the learning management systems of every curriculum to reach the goals of training. The related theories are presented as follows:

2.1 **Chickering's Student Development Theory** focuses on the personal characteristic development of students in the age group of 17–25 years old. Personal characteristic development occurs at intervals in a lifetime, and each period of age group usually takes one to five years to develop suitable characters. The development depends on the surrounding environment, which may be either positive or negative. According to Chickering, college or university students at the age group of 18–23 years old must undergo the process of developing seven major personal characteristics, including developing competency, managing emotions, moving through autonomy towards interdependence, developing mature interpersonal relations, establishing identity and developing integrity.

That is, the development of intellectual, physical, emotional and social skills. Students are usually self-reliant, but they sometimes become appropriately dependent on others. Patience and confidence are also outstanding characteristics of the group; however, students are expected to be able to create their own identity whilst accepting individual differences with respect to others' opinions. Last, the qualifications are being purposeful or determined to set their life goals and plan for achievement and being honest with strong responsibility for surrounding community and society (Chickering, 1969; Higbee, 2002).

2.2 **Authentic Learning** is a learning management system that allows learners to deal with actual working situations, problems and contexts to learn and search for information and solutions to

problems. Simulation technique is occasionally used, focusing on the practice of skills in thinking, discussion, decision-making and implementation, all of which are applicable in daily life. The simulation activity emphasises on academic challenges in problem-solving that lessons to be taught should be set up into questions for learners to brainstorm for proper solutions. Specifically, role play by learners in scenario challenges can facilitate the learning process and certainly lead to the comprehension of the actual situation (Herrington, 2005; Tisana Khammani, 2007).

2.3 Kolb and Experiential Learning Model focuses on creating concrete experience for learners by means of reading, case-studying with challenging problems, observation and remarks obtained from scenarios, textbooks, movies and games. Learners must attentively observe, record the issues derived from the brainstorming and discussion then attempt to form a pilot project or an initiative plan to be implemented in a field or in a laboratory.

Kolb and Experiential Learning Model aims at the development of cognitive complexity in which learners can develop their critical thinking, content knowledge, motivation to learn and problem-solving ability and that they can apply more easily the lessons learned in their future careers (Kolb, 1984).

2.4 Practical Intelligence Model, proposed by Sternberg, is one of the three-component theory called Triarchic Theory of Human Intelligence: Analytical Intelligence, Creative Intelligence and Practical Intelligence, which has been developed and widely used since 1985. According to Sternberg, Practical Intelligence is an ability to apply the knowledge from classroom theories and textbooks for troubleshooting and managing all affairs in real-life. Practical intelligence comprises four characteristics as follows (Sternberg, 1986; 1997):

1. Use: The ability to use knowledge is derived from an intensive and thorough research on existing notable theories by means of critical thinking, analysis, interpretation and evaluation until it is proven that the knowledge is accurate and reliable. Finally, a body of knowledge can be extracted for application in the future.

2. Apply: The ability to apply the knowledge obtained from a thorough process of analysis, interpretation and evaluation for trouble shooting in everyday life. One must consider whether or not such knowledge is feasible for the present situation and thinking, belief, perspective and social values. Consequently, to apply is to select available knowledge, which is practical for the current context and problematic situation. Three ways of applying the knowledge exist in the current environment or social context.

Adaptation is the way that students attempt to change themselves to be compatible with the environment or the current situation; for example, to improve themselves to have qualifications required for the job positions. Shaping is the way that students try to rearrange or change the environment or the situation context to be appropriate for themselves, such as modifying certain job requirements according to their qualifications and abilities. Selection is the way that students finally find out that they are incompatible with the environment or the present situation context. Hence, they make a decision to either change themselves or move out to a new environment or situation context that are preferable; for example, deciding to resign and find a better job that is suitable for their

abilities. Sternberg stated that to choose either way of application mentioned above, it depends on how students can integrate their knowledge to cope with the problematic situation.

3. Implement: The ability to review, certify and thoroughly plan for implementing the selected knowledge to achieve the desirable outcome. The procedure of implementation must be clearly defined in each step on what to do to solve a problem and what are the expected outputs and outcomes. The final step, which is critically important, is to ensure an efficacy of the planned problem-solving process that is to evaluate whether it is effective or ineffective. It will be able to achieve the intended objectives and desirable outputs and outcomes or not because the designed problem-solving process must be applied to the real-goal planning.

4. Practice: The ability to put into operation the knowledge that has already been examined throughout the abovementioned process of application, review, certification and evaluation until it is proven for practical usage in real-life situations, which may differ from the learned scenarios; that is, learning beyond the body of knowledge instructed in the classroom.

All concepts and theories presented above are major principles in designing learning activities for apprenticeship because trainees must examine and evaluate the body of knowledge and lessons learned until they can synthesise proper procedures and solutions to the problem for practical implementation in the training workplace. During apprenticeship, trainees should gradually gain not only experiences but also skills that are beneficial for their career in the future. The learning management design shall therefore aim at the goals of the training process, namely, knowledge, skills and attitude in accordance with Benjamin Bloom's taxonomy: Learning in action, which comprises three domains of educational activities, namely, cognitive, affective and psychomotor domains, for the most effective innovation-driven apprenticeship to develop enterprises in the actual context.

3. FRAMEWORK OF PROPOSED APPRENTICESHIP PROGRAMMING

A model of learning activities in professional training or apprenticeship is built around an action-based pedagogy, through which students learn to manage the complexity of technology-based business in simulated business scenarios and the development of real innovation projects. Then, the learned knowledge, concepts, theories and principles in classroom lessons will be applicable for real working situations in organisations.

Such an apprenticeship considers the national policy in an aspect of innovation-driven society requiring joint cooperation between educational institutions and business enterprises with the goal of producing qualified and competent graduates who can become start-ups of their own businesses or can contribute to the research and development of the country. This requirement prepares human resources to step into a society of innovation in response to the changes of the world in the 21st century (Salavert, 2015). Therefore, the learning processes in an innovation-driven apprenticeship programming must be well-designed in consultation with the entrepreneur to create innovations that satisfy the requirements of the enterprise (Shaw, Gordon, Xing & Carroll, 2019).

As far as the goals of the training process are concerned, apprenticeship programming must be well-planned to facilitate and encourage trainees to exercise and develop their knowledge and skills during

on-the-job training in relevant workplaces, so that they can finally be qualified for their careers in the future.

The author aims to present a proper apprenticeship programme, which contributes to the goals of the training process and inspires desirable innovations in compliance with the contexts of the enterprise hereinafter mentioned as Enterprise Innovation-driven Apprenticeship. Enterprise Innovation-driven Apprenticeship is an on-the-job training course pre-requisite for undergraduate students. Trainees must spend one semester or at least 200 hours in the on-the-job training, which is divided into four phases as follows:

Phase 1: Orientation and Adjustment of Trainees (four weeks)

During the first four weeks of Phase I, trainees will be introduced to relevant workplaces in accordance with their fields of study where everything is new to them. An orientation is to study a profile of an enterprise (i.e. vision, mission, organisational structure, context, scope of work and a job to be assigned to each trainee). Attentive learning and observation are required to understand the context of work prior to applying theoretical knowledge to an assignment. In addition, trainees as newcomers must learn to adapt themselves and familiarise with the new environment, assignment, tools and equipment, supervisor or mentor, co-workers and training peers. This is a role change from being a 'student' to being an 'employee' of the enterprise.

Phase 2: Assignment Performance in Search of Creative Innovation (five weeks)

Trainees should be assigned to do the assigned jobs in accordance with their professional fields of study. They must bear in mind to practice their cognitive working skills to enhance an efficacy for the advantage of the enterprise or organisation. In learning by doing under the guidance of experienced mentors, trainees will be able to develop positive relationships within the Community of Practice along with the abilities to evaluate their performance and detect strengths and weaknesses, including problems or obstacles that hinder the implementation of the work process. Essential skills to be developed during this phase of training are how to handle problematic situations, how to find proper solutions and how to conduct self-evaluation and analysis of the work process, particularly practical and impractical methods or steps of work. Trainees can propose alternative solutions on the basis of their theoretical knowledge and the existing contexts of the enterprises.

Phase 3: Proposal of Innovation-driven Project (three weeks)

Having on-the-job training experience for nearly two months or eight weeks, trainees are expected to have comprehensive knowledge of the assignment, including the scope of work, the work flow process and strengths and weaknesses, problems or obstacles that they encounter. In connection with these expectations, projects on innovation creation must be proposed for work improvement comprising details of the proposed solutions and innovations that may be commercialised, period of implementation, persons in charge, target groups and expected outputs and outcomes. The proposed innovation can be new methods ways or patterns, which are currently created. Prior to implementation, the proposals must be in accordance with the context of enterprise and students' fields of study.

Phase 4: Innovation Project in Action (four weeks)

The created innovation projects, which will be reviewed and approved by responsible instructors, supervisors and mentors will be then implemented to the target groups accordingly in real context trials. Reports should be submitted upon completion. The results of the method, approach or model must be reported as the innovative use. The effectiveness of innovation, which enhances strengths or solves problems, can be provided with suggestions or observations in the development. Notably, this learning management system helps learners create innovations from problems discovered in real practice. By then, the solutions and innovations are finally proven feasible to what extent or impractical, as concrete pieces of evidence of the improvement, as other suggestions or opportunities for improvement and how to enhance the further development of innovation.

The proposed four-phased Enterprise Innovation-driven Apprenticeship Programme is a guideline for producing desirable qualified graduates in accordance with the national policy. They can learn from what they experience during apprenticeship. The proposed apprenticeship programme has been implemented to lead them to create innovation for making strengths or solving problems in different settings and contexts, and they will certainly be competent in the fast-changing world in the 21st century. It is usually proven successful for students and satisfactory to the innovation-driven creations for the future with stability, prosperity and sustainability.

4. CASE OF THE APPRENTICESHIP PROGRAMME

Case Study: Enterprise Innovation-driven Apprenticeship Programme in Psychology

This case study involves a university student as a representative trainee majoring in Psychology who chooses to obtain an apprenticeship at a Juvenile and Family Court. After an orientation and preliminary study of the Juvenile and Family Court organisation, the scope of work and various work procedures, the apprentice or trainee has a comprehensive understanding of the court contexts and job descriptions of every position (the expectations, roles, responsibilities and requirements of a certain job). At an early stage, the trainee can go through adjustment and socialisation with the environment in the real situation.

A mentor, who is an experienced psychologist, is at the court to facilitate the apprentice's learning process and assign a job for practice. The trainee is determined to pay attention to studying in detail whilst performing the job. As a result, the trainee learns to notice that some strengths are beneficial and some weaknesses or obstacles hinder the work procedure and attempts to find a proper solution by applying the learned knowledge and exercising related skills.

Later, the trainee becomes interested in counselling juvenile delinquents and has an opportunity of more than two weeks to witness many cases of counselling showcased by the mentor. This method of instruction avails an integration of classroom knowledge with the actual situation provided that the trainee must record all findings from the observation and consider whether they are relevant to counselling concepts and theories.

Afterwards, all trainees on this subject from the same or different universities gather for knowledge sharing when they take turns in presenting their findings and opinions; they can discuss freely; however, they find it difficult to organise the collected data, which are scattering, and some are

irrelevant to the point of interest. To solve this problem prior to proposing a draft of an innovation-driven project to the mentor, the representative trainee can come up with an idea of making a 'Checklist of Counsellor's Behaviours'. This checklist should be a guideline for observation in the same direction, focusing on essential issues and noticeable behaviours to enable proper data collection; doing so can satisfy the purpose of development into a practical body of knowledge to be applicable in a real-life situation. As a result, the trainee and peers manage to prepare and become successful in being apprentice counsellors for juvenile delinquents, and their experiences are certainly worthy for their professions in the future.

5. CONCLUSION

Apprenticeship or professional training is essential for every curriculum at the undergraduate level because direct experiences gained from on-the-job training are beneficial for students to prepare themselves for their future careers. Such training enhances the opportunity for trainees to develop important characteristics, including skills and attitudes, which are necessary for working in real situations (i.e. knowledgeable, competent and skillful). Trainees are encouraged to integrate the body of knowledge that arises from the concepts and theories learned in classrooms, and then apply them to real-life working situations in their professions. They must be able to discover the strengths of the organisation enabling further development or identify problem issues to be resolved with new ideas or innovations. The capabilities of theoretical knowledge application, multi-skill development and innovation creation should satisfy not only relevant enterprises but also the Thailand 4.0 demand to encourage and inspire more start-ups as creators of innovations to manage clear and substantial apprenticeship programmes for learners.

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