

## **An Approach to Database Management : In the Context of Thailand's Rural Agricultural Settings**

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### **ABSTRACT**

This paper explores a strategical alternative in generating and mobilizing a participatory research, extension, and application force to promote a wide range of pragmatic mixed multi-disciplinary perspectives concerning the persisting and emerging issues under our changing rural agricultural society. A systemic linkage between the academic and potential functional user's social systems could be designed and directed towards effective farmer extension work. This system could be best in serving as a two - way integrative communicative mechanism to enhance a continuing new locally adapted information - technology supply network to occur along a science - theory - to use continuum. The interactive interface between research and extension structure would need to be initiated and facilitated to meet the desired goals of the beneficiaries with their self correction, and redirection, and a potential for governance at the grass - roots level. This is directed towards a problem - centered community - based approaching manner to meet the immediate needs and desired goals of the vast majority of rural people.

Operationally, the premise would be able to motivate, and facilitate the basic essential roles and functions of the participating systems in the process of planning and implementing change. It needs a continuous process of monitoring, evaluation, and re - evaluation for suitable changes and modifications. The content and process concepts also need to be carefully considered and re - considered ; based on the background, problems, needs, interests, as well as time and facilities of the people for a suitable balance between educational change area and subject matter area ; in providing effective learning experiences beneficial to the intended rural people as the significant end.

### **INTRODUCTION**

Beliefs and values underlying an integration of population education through rural agricultural development networks represent a special kind of group action to achieve the desired ends, via government agencies, for the improvement of rural quality of life in our society. A case study of Kasetsart University team for database management in cooperation with SEARCA is designed to

provide a framework for reflection. It is logical, then, for this paper to draw attention to and promote a wide range of science - based, methodology, multi - disciplinary perspectives concerning the issues confronting our country. This will be within and between the academic and functional user's social systems to support problem solving at the grass - roots level. The strategy and programmes designed to improve the quality of rural living conditions and life styles weigh

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heavily on human behavioral development to meet the modern living demands. These demands are generated by a constant interaction between the culture and the nature reflecting human needs which are social, economic, political, technological, institutional and educational in nature.

This paper attempts to address the needs of the country by examining certain issues, particularly : (1) What are the persisting and emerging situations in dealing with agriculture and extension work of the society ? (2) How can research, extension, and application force be organized for effective planning and implementing change to meet the development needs and desired goals of the society ? (3) What are key functions and roles of the various relevant systems in contributing to the success of the endeavour ? (4) How can we determine whether the goals are being attained ? Answers to these issues are based on the following assumptions. (1) There is a general recognition of the national policy of support and action to have important impacts upon research, extension, and application strategy and programmes and upon the development of sound satisfactory rural agricultural economy of the country. (2) Two major social systems, namely, the academic science - theory based institutions with capabilities in teaching, research, and extension duties directed towards manpower building for development, transformation, and flow of information - technology to produce the greatest diversity of thoughts and diversity of potential users as with those relevant government line agencies in their innovative experimental - adaptive based - to - actual use continuum have as their key functions and roles to serve the best interest of the intended population. Coordination and integration of new knowledge or practices into operationalizing local - level planning and implementing strategy and programmes within and between the two systems are essential. (3) The present and future expected integration function is dependent, to a large extent, upon the competency of development

personnel in working with and through individuals and groups of the intended people as to motivate and educate the people. A team or problem centered approach for decision making and problem solving enables them to adjust effectively in the changing environment. (4) The institutional support systems in the allocation and integration together with the mobilization of different inputs other than the information for the functional user's systems must operate so that the needs and interests of the target groups are continually supplied. (5) The bodies for information - technology generation, validation, transformation, and flow must jointly perform and link all basic essential jobs to facilitate research, extension, and application integration functions at all points of practical concern.

## **The Environment**

### **Natural Conditions**

Khao-Kor watershed, one of the three selected areas for a case study of Kasetsart University core team in database development, is located in Petchabun province, Northern region of the country, 390 kilometers from Bangkok. It is entirely in mountain highlands and creates a watershed of the Khek River which drains into the flat mountain plains, lower slopes, and plateaus between mountains filling up alluvial deep top soils with the pH or soil acidity of 5 to 6. The combined total land is about 40,000 rai ( one rai is equivalent to 0.395 acres, or 0.16 hectares ). Altitude of the area ranges from 600 to 1400 meters above sea level with the relative humidity of 82 to 85 per cent. The average temperature ranges from 16°C to 28°C. The average annual rainfall during May to November varies from 1500 to 1800 millimeters. Dry season extends from December through April. The diversity of soils, drainage, and climate of wet, moist, cool, and dry has led to the development and introduction of various kinds of plants including the ornamentals, food plants, and economic crops. The

introduction of plants, and animals has facilitated the formation of highland agriculture in the area.<sup>4</sup> The King's Development Project of the Khek River started in 1977 has become an impetus to rural agricultural growth as more people being moved into the area through the allotment of 15 to 20 rai of land for each of the farm family.

### Social Settings

A parallel development activity in Khao-Kor watershed comes with the establishment of the project/programmes of different agencies based on the desirability of and the need for additional attention to farmer extension strategy and programmes in the area. In the beginning, the development was undertaken by the armed force core team for security reasons. The settlers were moved into the area with self-sufficient agriculture wherein production was mainly for home consumption, and extensive type of farming whereby a small amount of family labour and capital inputs could be applied to their land resources. This was a major force contributing to agricultural growth as many farm households were needed to be fed.

Presently, the expansion of development activities, to a large extent, has involved more government and non-government agencies including a number of graduate volunteers from various fields and institutions. These agencies are : the Khek River Reserved Forest Project, the Open - Forest Wild - Life Project and the Forest Protection Project of the Royal Forestry Department, the Highland Agriculture Experiment Station under the Agriculture Department, the Water Reservoir Ratanai Project under the Royal Irrigation Department, the Association for Population - Community Development, and the Project on Farm Demonstration and Enterprise Promotion of the Boon Rawd Brewery Co.,Ltd., among other development projects/programmes undertaken by frontline ministries which have as their own concern the development activities in the province.

## THE OPERATION

### Operationalizing Planning

Much assistance has been given in operational planning and implementing change to bring about local resource use and mobilization for better job and employment creation. The efforts of local agencies and private organizations have facilitated development activities. Some of the activities, particularly, those under the non-government organizations have involved people's participation to a much larger scope. Connecting roads to meet transportation needs give added significance to the development of the growing villages in the area. Extension work of different agencies has continued to progress and momentous changes have occurred in many parts.

Gradually, culture patterns have become more and more firmly established in the more settled portion of the villages. The situation has forced the farm households in 4 main villages and a total of 33 hamlets with 50 - 60 families in a hamlet and 4 - 5 persons per family of the district of Khao-Kor to constantly adopt and adapt new farm practices as added techniques of their own life styles. The farmers of the newly settled villages have produced more farm produce than their traditional practices in rice growing. Their farm produce includes such crops as asparagus, passion fruit, and coffee. One major force contributing to the improvement of agriculture is the extension work of the various agencies.

### Major Development Problems

The first major problem is the administrative deficiency in dealing with the extension work. Since there are many agencies doing similar extension work with the same goal in mind, this adds to duplication and confusion to both the officers and the villagers. A specialist in one area who is the most persuasive often influences the people of the area to concentrate on one specific enterprise rather than on others which would be more beneficial to them. Another problem is the lack of

qualified educational development personnel in working with and through people. Moreover, the use of the officials as extension "change agents" brings to the problem as the factor of human behavioral change. The problem is centered around the fact that government officials with more "power over" in their authoritative status rather than "power with" in their participative status. The people thus have with the officials an unfavorable aura that the people may be unwilling to associate with the officials or actually be indifferent. Change in attitudes and change in performance of the people require time and special efforts.

The drag of culture and tradition in combination with the condition of land tenure, the lack of suitable farm credit, and the limited off-farm technical development has influenced most of the farmers to become small - scale peasant operations with the dominance of rice cultivation. The small size of farms associated with the limited investment capital has bound the farmer to a traditional technology and low productivity. Living conditions on the farm and in the home are poor.

One weak point in economic structure is that the farmer has not engaged in the active business of farm produce trading and marketing. The trading and marketing activities have thus been dominated by local middlemen. They control the greater part of economic life in the rural farm communities. They have gained powerful economic position due to the institutional shortcomings including insufficient institutional farm credit, inequitable land tenure, and poor educational facilities to support the farm people. Under such circumstances the farmer has been at the mercy of the middlemen. This may give the middleman the power to dictate the final selling price irrespective of the actual market quotations. The middleman's strong position as trader is thus a most pressing problem. The marketing problem is perceived being intimately related to the struc-

tural conditions of agriculture. As long as the agricultural industry of the community does not encourage the farmer to organize efficient marketing organizations and credit facilities, the middleman will remain an economic necessity. The farmer is forced to be at the mercy of the middleman. This situation is always in urgent need of cash, and is competing with his peers for the highest cash advance on his crop.<sup>1</sup> This combined characteristic has probably been one of the most important determinants for the pattern of economic development in the farm community.

Any programme designed to improve living standards and quality of rural life would need to be based heavily upon the increased productivity on the farm and in the home. The efficiency on the farm would need to cover production and economic factors relating to increased output, reduced cost, and the use of substitutive and complementary enterprises that may compete more advantageously with products from other places. Changing patterns in consumer demand and the increased need to farm products which are high in total value and have high comparative advantages in nature are important areas to be explored. There is a need to increase specific fields, to understand farm credit and financing, and to acquire concepts with values and skills in decision - making and effective action capacity in the management of the farm.

The efficiency in marketing on the other end is based on productive anticipation, decisiveness, logical planning and implementing aspects in providing services and adding utility to farm products. Selling farm products of quality, and at a price that appeals to consumers is necessary for the farmer at the present time. In addition, the price of farm products is directly affected by various costs in different stages of marketing structure such as storage rate, transportation, delivery, inefficiency in handling, spoilages, and all other charges against the product. Moreover, there are many areas outside the community

supplying farm products which compete with local farm communities. The proper training and motivating strategy and programmes will help to promote efficient, day-to-day production and marketing operations of the rural farm people in the community.<sup>3</sup>

Increases in population, technology, social institutions, and educational facilities hold large potentials for production and marketing expansion. The development programme in conservation, wise use, and development of natural and human resources, management on the farm and in the home, family living, local leadership development, community improvement and public affairs in the vast majority of rural farm communities is considered being the major concern in our rural and agricultural society.

### **Emerging Perspectives and Outlook of Farmer Extension Work**

#### **The Dimension**

Important elements of increased outputs reduced costs, changes in farm enterprises are essential for the farm business. Socio - cultural - economic - technological - political and institutional facts are vital for planning and implementing change. Farm and community resource development as the cross - section of community life, industries, interests, and organizations is the process carried through for the people and by the people themselves, for the improvement and enrichment of the entire community. The basic responsibility of the development force is in the development of the people themselves ; by motivating and helping them to approach their potential in knowledge, abilities, skills, attitudes, and appreciations, so that through their initiative they will be able to effectively identify, define, and solve problems affecting their own welfare. These problems may include the development and utilization of natural, physical, institutional, and educational resources. The principle, method, technique, and device involved should include

an analysis of the environment, definition or examination of the problems, examination of alternatives, decision making, action, and evaluation.

#### **The Direction**

The success or failure of rural agricultural development plans will be dependent, to a large extent, upon the degree to which the majority of the farm people are appropriately motivated and educated to adopt and adapt new and better productive technology and techniques. The interactive interfaces within and among the systems between research and extension work need to be in the manner in which the information transfer and exchange process operates to meet the needs and interests of the intended clients with a self correction redirection mechanism and with a potential for government at the grass - roots level essential for supplying the needed information of the clients. The processes require ability and motivation of their respective staff and also require a type of functional specialization necessitating intensive interdepartmental coordination and cooperation in the efforts of resource allocation and integration.

#### **The Approach**

A rational pragmatic mix of approach needs to insure the balanced and interconnected concepts, values, and professional skills of the development personnel. This is directed towards producing competencies in working with and through individuals and target groups particularly the poorest. The basic contention groups as being targeted is that the farmer extension work could be handicapped due to the limited competency of development personnel in incorporating practical technical content and process concepts from research discoveries into their development job functions.

A rational systematic and systemic linkage of agricultural extension work structure could be developed based on potential, and available re-

sources and expertise of the academic innovative system and the government development front-line agencies. This premise could bring many coordinative and cooperative efforts in planning and implementing change to improve the rural quality of life and thereby improve disadvantaged groups. The programme to bring about better level of rural living could be done by the development personnel with better job performance. The responsibility is primarily to help the rural people to develop their capabilities in decision making and problem solving and coping in order to adjust themselves effectively in the changing environments.

### **Toward Institutionalization of Information-Technology Supply Networks**

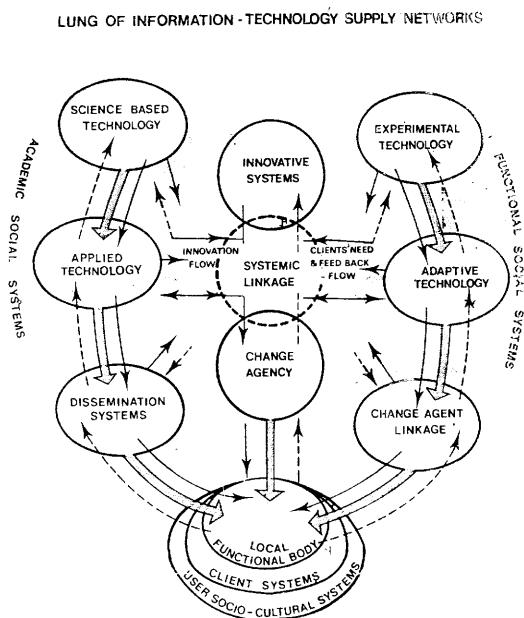
It is logical for an innovative information - technology generating - utilizing organizational arrangement through a systematic and systemic linkage between the two major systems, the academic science - theory based and the functional experimental - adaptive user social systems. This should be designed with a central philosophy of extension in helping the people to deal with their own problems, and of academic institutions in generating and delivering new knowledge for the greatest diversity of thought and diversity of potential user systems. This system would enhance a continuing new locally adapted information-technology supply network to occur along a science - theory - to - use continuum ( diagram ). As a constituent system, the government supported rural agricultural universities, faculties, and institutes could be able to provide their facilities and expertise as a more broader concept and accurate total national structure and process with increasing capable professionals jointly financed by functional user's agencies at all points of practical concern.

An integrative communicative system for the information - technology generation, validation, transformation, exchange, and flow for effec-

tive coordination, cooperation, and integration as to help devise a joint effort with a problem centered approach to identify, define, and address recurrent community problems in dealing with human, social, economic, political, technological, institutional, and educational concerns could be effectively facilitated.<sup>2</sup> Operationally, the premise would be able to motivate, and facilitate the basic essential roles and functions of the relevant social systems in the process of planning and implementing change to support rural agricultural development strategy and programmes through the institutionalization of new and potentially alternatives into various delivery systems as being a community based approaching manner to meet the immediate needs and desired goals of the vast majority of rural people. It is important for this system to work and meet the needs and desired goals of the potential users and to maintain a two-way transfer and exchange of new ideas or practices between development staff and the people outward to the points of practical concern, that is, from information development to actual use. Some on - campus faculty who are responsible for teaching, research, and extension trio job functions would need to be assumed responsibility and willing to serve as the developer in the rural problem - solving context. Particularly, the technical and management sharing responsibilities with the local bodies and line ministries are needed to support local - level planning and facilitating change. They would be able to address problems that arise in the field and help identify and define what these problems are. A few staff members must be assigned to facilitate integration, coordination, and application of the available knowledge. This arrangement for the integration of a diversity of resources, particularly human, material, service, and agency would be able to bring together in an interactive trio among information developers, information users, and extension agents. The integration function could be examined in terms of the linking activities both

the process and the condition of fitting new ideas or practices to suit the user's systems in supporting the decision - making capability and action capacity in problem solving and coping to meet the development needs of the people.

### Lung of Information - Technology Supply Networks



### MODES AND MECHANISMS OF DATA MONITORING AND EVALUATION

#### The Objective

With the direction of the new rural development guidelines to insure the rural poverty alleviation programme for the country,<sup>5</sup> the objective has set forth rural extension work to bring about : (1) understanding of principles, methods, techniques, and devices to work with and through the individuals and groups of beneficiaries in motivating and educating them to cope with the problem and consequences of the changing society ; (2) developing and strengthening the proficiency in the application of the principles, concepts, values, and professional skills in plann-

ing and implementing change ; (3) developing a spirit of inquiry regarding research, extension, and application as broader concepts in the generation, validation, transformation, and flow of new knowledge or practices through common farmer extension system ; (4) developing the proficiency in designing and conducting field action research project/programmes which might answer the questions to effect desired behavioral change in the people ; (5) developing good and appropriate educational leadership qualities which would increase decision - making capability and action-taking capacity to cope and solve the problem ; and (6) developing the value and appreciation of the need for continued intellectual development throughout life and commitment to the attainment of this significant end.

#### The Framework

The basic framework for the designed programme would need to be based on the following components : (1) modules or packages of the identified content and process concepts should be developed to facilitate the development personnel to comprehend and use the concepts in the functions of managing effectively—in creating, planning, organizing, motivating, communicating, and supervising tasks--- in the logical points of the system ; (2) modules or packages developed should be relatively complete with several ways and means of presentation based on the level of education, interests, and facilities aside from time factor appropriate for the people involved--- the field personnel in particular do not have much physical time to go back and use the same kind of presentation to the same group of beneficiaries, as the teacher would for instance be able to use the same presentation for a review to give the class a test ; and (3) approach to the transfer of knowledge, values, and performance for all levels of personnel should be material based with sufficient technical confidence in a given subject matter area that can be taken as reference. This requires more varieties of media support in bring-

ing about learning power to meet the needs and interests of the beneficiaries.

### **The Supervision**

A work plan based on determined performance indicators as a part to form the whole system needs to be developed in certain details directed to : (1) identify areas in the community to be based ; (2) identify target groups to be reached ; (3) define the frequency of inputs from the field personnel ; and (4) define the basic concepts to be discussed in the community. A structured diary as a simple tool needs to be developed to enable the staff to evaluate his or her own activities, and to use the tool for discussion with the supervisor and as a source of information for making effective reports.

### **Point of Management**

As a systematic and systemic linkage mechanism for effective job function at the various levels, committees need to be organized. At the national level, a committee chaired by a neutral body should comprise members representing various relevant agencies, as to function in determining the regular frequency for meetings to discuss and act on the management issue from the field level. At the local level, the scope of work needs to be included as an agenda in the existing committees at the regional, provincial, district, and village field levels. Feedback upwards and downwards through individual organizations need to be secured. The supervision through the individual organizations, while reports being fed upwards to the national committee is essential for effective job performance.

### **Monitoring and Evaluation**

Monitoring, as a part of evaluation, deals with the planning and implementing change in the programme. It focuses on the inputs, activities, and outputs for a high probability of success. The process of evaluation and monitoring continues through all phases including pre - planning, planning, implementation, and assimilation.

Evaluation, with its focus on the weaknesses and the strengths of the programme, is not confined only to target group evaluation but also examines the inputs, processes, antecedents, and other important stages of assimilation. An evaluation is an integral part of the whole programme cycle.

The success of the programme implementation is dependent to a large extent on which on going extension systems could fully co-ordinate and cooperate with the academic system in preparing, supplying, and/or upgrading qualified manpower for their systems. The cooperative effort between the academic system and the functional user's system would be added impact for the integration function and the continuity of the programme.

The programme is subject to change to reach its optimum effectiveness of integration function to bring about the desired behavioral change. The programme designed needs to be in a continuous process of monitoring and evaluation and re - evaluation for suitable change and modification.

The content and process concepts included in the programme need to be carefully considered and re - considered for appropriate change for a balanced educational change and subject matter areas based on the background, problem, need, interest, time, and facility of the beneficiaries for optimum development.

### **CONCLUSION AND IMPLICATION**

A great deal of emphasis in dealing with the rural agricultural area of concern is on farmer endeavours. A strategical alternative for a total national generation, validation, transformation, and flow of need information - technology is being directed towards the allocation and integration of potential natural and human resources available to bring about rural agricultural modernization contributing to improved farm productivity, utilizability, marketability, and profitability of farm produce to meet the

need and desired goals of the vast majority of the rural farm people.

The success or failure of rural agricultural development plans to a large extent is dependent upon the degree to which the majority of the farm people, particularly, the poorest of the absolute poor groups as direct beneficiaries are motivated and educated appropriately to adopt and adapt better productive practices. This implies and requires effective farmer extension system to serve as a two-way link in passing on new knowledge, discoveries, and techniques of research to the farmer and in relaying the farming problem to research for solutions. The interactive interface between research and extension activity must be in such a way that the information transfer and exchange process operates to meet the client's needs, and interests with own self correcting and redirecting mechanism as well as a potential for governance at the grass - roots level as to supply needed information. The ability and motivation of the respective staff and the intensive interdepartmental coordination and cooperation in resource allocation and integration efforts are of important elements of the process.

A pragmatic mix in mounting balanced and interconnected productive concepts, values, and professional skills in producing competencies essential for effective job performance is needed. The basic job responsibility is to help support the rural low - income and socio - economic depressed groups to develop their capabilities in decision - making and problem solving and coping capacity as to help them to enable to adjust themselves effectively in the changing society.

Structurally, the research - extension - application system should have connecting links at the individual, community, and governmental levels as to coordinate, cooperate, and expand the role of extension work within and among development agencies and learning institutions for concerted efforts and and cooperative decision and action in planning, legitimization, and imple-

menting programmes to accelerate rural agricultural development networks. Such system could enable to provide basic essential farm supplies, services, credit, processing, marketing, and others. Due to the fact that public support and local leadership commitment of the society are anchored in the village, district, and provincial councils variously composed of the appointed representatives, it is significant that extension mechanism can involve the bodies as a supportive base in providing services to the people to collectively provide for supporting themselves in what they want to do. Aside from the local bodies a number of agencies and organizations that support agricultural production, processing, marketing, consumption, businesses plus the ones instituted to run enterprises to promote the general life, socially and economically, are also needed to be linked. The extension agent, the subject - matter specialist, and the local people the trio extension corps at the village level are key persons in planning and implementing change to insure close ties with local residents. Through educational leadership quality and intimate contact between the people and extension mechanism, extension agents would be able to identify, define, and address the problems and seek solutions jointly with the local people and the specialists. They would motivate and facilitate the local leadership to want to do things about their own community problems and needs. The specialists should be able to provide technical know - how in the various subject - matter areas, and to work in connection and cooperation with the different research departments and institutions as well. The extension agents, and the subject - matter specialists, would be able to provide a two-way integrative communicative linkage between the people and the local power structure, the planning bodies and councils.

The organizational arrangement through a systematic - systemic mechanism both within and between the academic science - theory based and the functional experimental - adaptive user's

social systems directed towards farmer extension work to help support the rural farm people to increase their capabilities to deal with their problems and directed towards the commitment of the learning institution in rendering technical services to the diversity of potential user social systems should be designed. This mechanism is to function in the coordination and cooperation of a joint research, extension, and application responsibility for the purpose of identifying, defining, and addressing recurrent community, human, social, economic, political, technological, institutional, and educational problems. It would be able to meet the demands of modern living conditions with the goals of the potential users and maintain a two-way transfer and exchange of new ideas between the development staff and the people involved to all points of practical concern, i.e., from information development to actual use. Operationally, some on - campus faculty who have regularly resident teaching, research, and extension job functions must be assumed responsibility and willing to serve as developers in the problem solving context. They would be able to address problems that arise in the field and help identify and define what the problems are. A few staff members must be assigned to motivate and facilitate the allocation, integration, coordination, and application of the available knowledge. The arrangement would be able to bring together in an interactive trio among information developers, information users, and extension workers. Information development and transfer capabilities differentiated along the two major systems could thus be properly linked. The users of development services in the respective local communities must be ready to adopt and apply the services considered being productive to them. The problems would be in the nature that all parties concerned being understood and pertinently addressed to be useful for their intended purposes.

The implication of the designed programme

is feasible only if the decision makers of the two major systems accept the concept as being valuable to their respective systems. The approach would be to widely convince for firm action of the relevant authorities in supporting the planned change. Adequate lead time is needed to initiate and facilitate planning and implementing change both within and among the various relevant agencies for the innovative efforts and concepts to be accepted and adapted effectively.

The success of the programme implementation to a large extent is dependent on which ongoing extension structure could fully coordinate and cooperate with the academic system in preparing, supplying, and/or upgrading qualified trained men for their systems. The co-operative effort between the academic and relevant organizations who employ qualified personnel will be significant for the continuity and the integration function of the programme. It needs to be flexible and adjustable in the adoption and adaptation to reach optimum effectiveness for the responsible relevant functional agencies, and also for the universities as well. This needs a continuous process of monitoring, evaluation, and re - evaluation to detect the strengths and weaknesses for suitable changes and appropriate modification. The content and process concepts included in the programme designed need to be carefully considered and re - considered for appropriate balance between the educational change and the subject matter areas based on the background, problems, needs, and interests aside from time and facilities of the beneficiaries so that optimum learning tasks can be provided effectively.

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