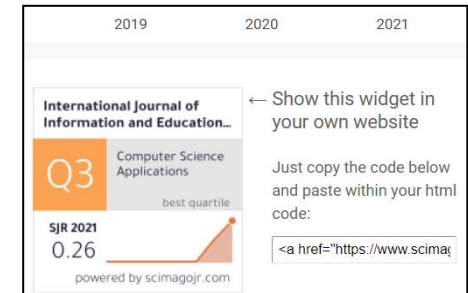


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### Comments to Authors \*

1. This paper is good, conducting an evaluation study using the CIPP model for the development of a learning course program called KPM121C as part of the Merdeka Belajar and Merdeka Campus programs in Indonesia (Policy of the Ministry of Education), as well as continuing with studies on the implementation of the program in the form of class action research which is applied to students and obtains a performance score of 75/93 increases to 85/93 and self-assessment from a score of 75/93 to a score of 85/93 requires discussion accompanied by theoretical support regarding changes in values as an instructional effect.

2. Additional explanations are also needed, indicators or assessment grids for courses using the HPKEM/HKIP instrument, how to value the validity and reliability of these instruments.


3. It is necessary to include learning theories that support research studies, namely student-centered learning, such as problem-based learning theory, project-based learning, and self-regulated learning. other feedbacks can be seen on the attached document

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# Strengthening Student's Competencies as the Z Generation and Future Change Agents: Learning from Extension Science and Communication of Innovation Course (KPM121C)

**Abstract**—The rapid development of communication and information technology has changed the way people interact. This phenomenon also influences the approach to learning and teaching. The paper aims to explain the KPM121C course development. An experiential approach was used in this investigation. The course has been selected to involve in the learning innovation competition program of IPB University. The program is managed by the Directorate of Program Development and Education Technology at IPB University. The teaching team learn how to develop a good course document and integrated it with the learning management system. In the era of the internet of things, students may learn from diverse sources. Data for the study were gathered from the course, including curricula, course contents, and student projects. The context, input, process, and product evaluation models were used to analyze the course. The results show that the learning and teaching transformation has shifted from course content fulfilment to strengthening the students' future skills. Based on self-evaluation of the course, we reformulate learning outcomes, completed course regulations and course documents, documented learning experiences, and co-operated with technical staff for more effective use of the learning management system. To be agile future change agents, learning and teaching should acknowledge students' needs, educational technology, real-world situation, and collaborative learning approaches.

**Index Terms**—agricultural extension, change agents, learning innovations, skills.

## I. INTRODUCTION

Alignment, updating, and development of courses are needed to help students master the expected competencies. For this reason, the Teaching Team of Extension Science and Communication of Innovation (KPM121C) always reviews the suitability of the course content with the student needs who are characterized as Z Generation and the workplace requirement. According to (Oog-Seng, 2003), twelve challenges impact how higher education institutions prepare students for the future. The challenges include, "worldwide economic competitiveness, changes in the economic and financial scene, new political landscapes, changes in the social scene, changes in industrial demands, changes in business and services, new patterns of consumer behavior, globalization, IT trends, the proliferation of innovations, changes in workplace demands, and changing expectations of employers." In relation to the course KPM121C, the course has experienced changes for more than fifteen years. The changes made for example are course content development, enriching sources of knowledge, and innovation in learning and teaching approaches (Amanah, 2020).

It is undeniable that the rapid development of communication and information technology has contributed to so many innovations in diverse fields. In agricultural

extension, for example, communication and information technology has been used by extension workers as a medium for channeling messages or information from and to the farmer community and vice versa (Abate, Bernard, Makhija, & Spielman, 2023; Ayisi Nyarko & Kozári, 2021; Barton et al., 2017). The use of communication and information technology in learning, the use of mobile learning applications, and the learning management system have increased in the last few years because of the need for efficient and effective ways for gathering knowledge and skills.

Many research and studies on the use of digital technologies for learning and extension such as (Barton et al., 2017) suggest that engagement of the community is very crucial to enhance learning effectiveness. Engagement of the learners, especially millennials, required a specific approach to reach. Four tips for communicating with millennials, (i) use platforms millennials are already using (Instagram, Facebook, or any other platforms), (ii) keep it short; and (iii) have a two-way conversation (Barton et al., 2017). In other words, the lecturers need to design materials that fulfil the student's needs in the future workplace. One of the lecturer's functions is to educate. This means a university teacher must develop the soft skills and hard skills of the students. The lecturers should know what the student needs to face future challenges. The concept to develop learning and teaching based on the learner's needs is well-known as a learner-centered approach. It has been acknowledged that the learning paradigm has transformed from a conventional (teacher-centered) to a learner-centred approach to ensure that the course fulfils the student needs (Amanah, 1996).

The course KPM121C aims to equip the students with the skills required as change agents for the future. In managing the course, the course coordinator and the course team member agreed to design the course with consideration to the use of appropriate communication and information technology relevant to the course learning objectives. Align with the course objectives, we applied for the competition grant on learning innovation in October 2021 managed by the Directorate of Program Development and Education Technology IPB University. We passed the selection and learned how to enhance the course that enables the students to learn better in the future. The article aims to explain the innovation that the course team developed and to share insights from the learning journeys to improve the course delivery strategy.

## II. THEORETICAL FRAMEWORK

Extension or advisory services as practices to facilitate

change for improvement have developed in diverse fields, not only in agriculture but also in the social (Barton et al., 2017; Brown, Schirmer, & Upton, 2021; Fatima, Windia, & Suamba, 2015), health (Brandon et al., 2022; Davies & Mental Health Foundation (London, 2019), education field (Amanah, 1996, 2020; Hartley & Andújar, 2022; Scheer, Cochran, Harder, & Place, 2011), environment (Amanah & Wala Kartika, 2022; Bennett, 2020; Kamruzzaman, Daniell, Chowdhury, & Crimp, 2021), and so on. Extension focuses on developing people's awareness, knowledge, and skills through learning designed based on their needs in a way that people find solutions that fit their situation. The outcomes from extension and advisory services can be seen through indicators such as better household income, better community (social stability), better community health, and a better environment (Amanah & Fatchiya, 2018; Brown et al., 2021; Knook & Turner, 2020; White, 1995).

Extension as a science has integrated with other disciplines including Communication, Education, Psychology, Sociology, Biology, Environment, Economics, and Business. We see that in the current context, a transdisciplinary approach has influenced the development of the extension. This reality implies that the framework for the course development (Amanah et al., 2022) should consider a broader view of extension as not just about the micro aspect of agriculture. In short, agriculture has connectivity with society, communication, economics, culture, business, and the environment.

The future work of extension education would be very challenging due to current issues in various fields. Regenerating agriculture for example a topic that has been discussed for years due to the decrease in agricultural resources quality and complex issues associated with people. policy, natural resources, and developmental approaches (White, 1995; Davis, Dolly, Lamm, & Lamm, 2018; Amanah & Fatchiya, 2018). In responding to these issues, the university must prepare the student with future competencies. Indonesia has approximately 153 million population in the range of productive age and 60 per cent of that population have skills in the digital age. In the last two years, there has been an increased demand in Indonesia for the skills of creativity, originality, initiative, and complex problem-solving (Schwabb, 2020).

To adapt to the future workplace, university graduates majoring in extension or development communication-related fields should have hard skills and soft skills in addition to basic skills. soft skills in critical thinking, creativity, communication, and collaboration should be developed well. In addition to the challenges in community empowerment for self-reliance, the course KPM121C contributes to enhancing the capacity of the students in problem-solving, communication of innovation. leadership, program planning and evaluation, media development with content based on the community's needs, and facilitation skills. One strategy to enhance students' competence is to maintain teaching excellence and develop innovation in support of student learning as suggested by (Garrison & Vaughan, 2013). Figure 1 shows the three elements of supporting student learning which consist of curriculum design, teaching strategies, and technology integration.

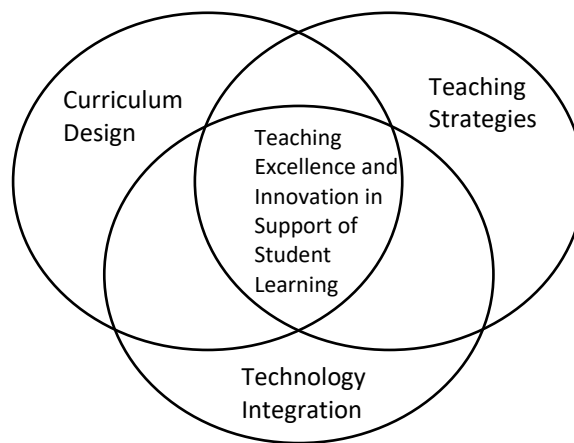


Fig.1. Elements to redesign course outcomes for supporting student learning (Garrison & Vaughan, 2013)

Learning and teaching can be managed through blended learning. Blended learning can be seen as the integration of selected complementary face-to-face and online approaches and technologies (Garrison & Kanuka, 2004). In the era of the internet of things, most educational institutions have practised blended learning to help students reach course-learning outcomes. Blended learning is a versatile (Okaz, 2015), so the instructor should decide to select from a variety of choices, depending on the learning context, and learning outcomes set for the students to achieve.

Achievement of learning objectives can be evaluated through several evaluation models. The Context, Input, Process, and Product (CIPP) Evaluation Model is very simple to measure the educational program from its product (Amanah, Suprehatin, Eugenia, & Chaidirsyah, 2021). It consists of four complementary sets of evaluation where the first three elements of the CIPP model are useful for improvement-focused or formative evaluation studies, while the Product approach, the fourth element, is relevant for summative studies (Frye & Hemmer, 2012; Hasan et al., 2015). The four evaluation types in CIPP Model contribute to the improvement and accountability of the program. From the evaluation results, the decision can be made for the program (termination, modification, continuation, or installation). One weakness of the CIPP Evaluation Model is that the output or learning objectives are the focus of evaluation, and it can be a problem when the first three aspects of CIPP are not considered.

To enhance students' competencies, a learning approach based on student needs and the skills needed to cope with future challenges is a necessity. Experiential learning approach and curriculum based on the student and workplace needs can develop the competence of learning citizens (Amanah, 1996). In addition to the approach, the learning environment greatly determines the success of students in building skills in innovation and problem-solving Fields(Amanah, 1996; Ovbiagbonhia, Kollöffel, & Brok, 2019). Course team teaching needs to review course content following the latest developments, the type of current students, the future needs, diverse learning methods, utilization of media, and learning technology.

### III. METHOD

The study was based on the course team's experience in improving course performance. The research process of the study was like the action research cycle. It started with the agreement of the research team to develop the course following the needs of the students and completing the course document into learning management systems. The research started in November 2021 and was completed in April 2022. The activities for improving the course were: (i) reformulating the learning outcomes, (ii) documenting the semester course plan including the learning materials, (iii) reviewing the course content, (iv) documenting the practicum materials and student projects, (v) assessment rubric, and (vi) self-evaluation the course performance using criteria from IPB University.

For evaluation, we used the Context, Input, Process, Product (CIPP) model to analyze the state of the improvement that we made before and after the program (Fig. 2).

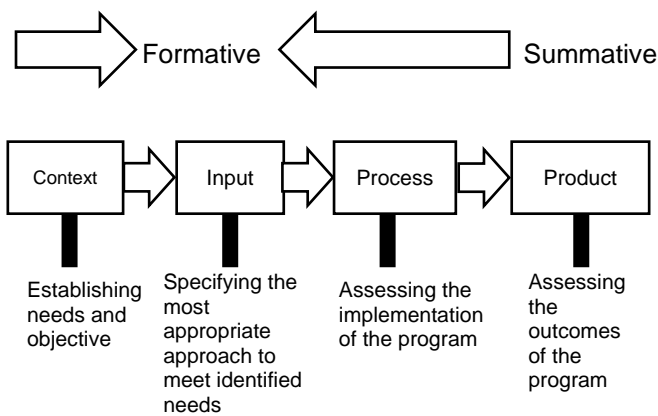


Fig. 2. CIPP Model of Evaluation (Stufflebeam, 2015)

The data were gathered from the self-evaluation made by the course coordinator using the toolkit from the Directorate of Development Program and Educational Technology IPB. The component of the instrument consists of seven indicators as shown in Table I.

TABLE I: INSTRUMENT TO EVALUATE COURSE LEARNING INNOVATION DAN PERFORMANCE

Dimension	Indicator	Total Item per Indicator
Course information	6	24
Information about the instructors	2	8
Technology and infrastructure for collaborative learning	3	10
Course content (learning materials)	4	15
Collaborative interaction	4	15
Assessment	4	13
Evaluation and feedback	2	8
	25	93

Source: (Herlina, Kaswanto, & Lestari, 2022)

The course team also collects data and information from course documents, discussions with the course teaching teams, and the student's projects. Data were analyzed qualitatively to reflect on what we learned and the insights from the journeys.

### IV. RESULT AND DISCUSSION

#### A. The Context: Course Overview

The Extension Science and Communication of Innovation (KPM121C) course is compulsory for Bachelor Undergraduate Degree students majoring in Communication and Community Development. In the K2020 Curriculum of IPB University, the course is grouped as Academic Core Course. The course aims to develop the competencies of the students so that they can work as change agents or advisors in their future careers. The course is designed so that students can create innovative communication programs or extension/advisory services, counselling, or non-formal education program. Through their potential, interests, and talents, the students enhance their hard skills and soft skills through lectures and practicums to achieve learning outcomes. Several professions that are relevant to the substance and process of KPM121C include advisors, program planners, policy analysts, social workers, facilitators, coaches, trainers, teachers, and counsellors.

The course content has changed since the early year 2005. Before the year 2005, the course of agricultural extension for Undergraduate Degrees was managed in four departments in IPB, namely the Department of Socioeconomics of Agriculture, Department of Socioeconomics of Fisheries, Department of Socioeconomics of Animal Sciences, and Department of Forestry Management. Since 2005, the Department of Communication and Community Development Sciences has managed the extension science course. The course content has been adjusted in a way covering extension science and communication of innovation from agriculture and related fields such as social aspects, environmental aspects, and business.

TABLE II: THE COURSE KPM121C PROFILE BEFORE AND AFTER UPDATING THE CONTENT

Description	Before	After
General topics discussed	From understanding extension, history, principle of learning, principle of communication, adoption of innovation, program planning, program evaluation, policy, and extension worldwide	The topics have been updated considering the use of digital technology in extension, additional topics for environmental extension as the case study
Practicum	More analytical	Analytical and creativity to develop media communication for extension-education as the Group Project
Availability of guest lecturers from practitioners	Rarely inviting guest lecturers	Guest lecturers/practitioners are invited to share experiences in the course
Assessment	Examinations, task, practicum, and participation	Student participation/engagement, group projects, quiz, and practicum
Learning platform	Classroom and field	Multiple platforms for learning

The course Extension Science and Communication of Innovation (KPM121C) is evaluated using the CIPP model as follows. Based on context evaluation, the workplace such as government agencies in the fields of agriculture and non-

agriculture for capacity building programs; private sector especially when designing a community engagement program, empowerment program, or corporate social responsibility; non-governmental organizations or civil society organizations require the graduate with a background in extension and advisory services, need assessment and training development for the community groups and development. In the context of university students, each student is obliged to undertake Student Service Learning or *Kuliah Kerja Nyata Tematik (KKNT)* in Indonesia Language (Bahasa). Student Service Learning should be implemented in the final year of study. The principle for service learning is rooted in the KPM121C course.

**Input.** The input for assisting students to reach their learning competencies includes the learning and teaching plan, time contributed by the student to learn, to complete assignments, contribution in group project including short video for extension and communication of innovation, lecturer's time contribution, hands out as a guidance for the students, infrastructure, time for consultation, practicum, and support systems. During the pandemic COVID-19, IPB University has supported all lecturers and students with the Zoom Account Pro to be used for learning, teaching, and related activities. Also, each department and faculty at IPB University has built a mini studio to be used for academic, student, and staff activities. IPB University and the Ministry of Education and Culture provided internet communication vouchers for students in the year 2020-2021.

Input. There are three aspects categorized as input allocated for learning and teaching the course KPM121C as shown in Table III including human resources, time allocation, and support systems.

TABLE III: INPUT ALLOCATED FOR THE KPM121C IN ACADEMIC YEAR 2020-2021

	Before year 2019	After year 2019
<b>Human resource</b>		
(i) Lecturers	three lecturers	four lecturers
(ii) Assistant lecturers	two assistant lecturers	three assistant lecturers
(iii) Supporting staff	one supporting staff	one supporting staff
<b>Time</b>		
(i) Time allocated by the lecturers	84 hours (preparation, updating learning contents, teaching, assessment, and evaluation)	70 hours (preparation, updating learning contents, teaching, assessment, and evaluation)
(ii) Time allocated by the students	48 hours (participating in the class, assignment, practicum, examination)	50 hours (participating in the class, assignment, practicum, group projects, final workshop for group project's assessment)
(iii) Time allocated by assistant lecturers	42 hours (preparation, facilitating the students in practicum, group discussion, presentation)	42 hours (preparation, facilitating the students in practicum, group discussion, presentation)
(iv) Cost allocated for the course by each student	in average: IDR625000 per student	in average: IDR700000 per student
<b>Support systems</b>		

(i) Learning Management System (LMS)	LMS was used for specific purposes	LMS has been used more intensively
(ii) Infrastructure	2 classrooms for lecturing and 4 classrooms for practicum (offline)	2 classrooms for lecturing and 4 classrooms for practicum, online classroom using LMS, zoom, and other online apps

Source: Authors

**Process.** The course applies a mixed method to enhance students' understanding of the course substance. The students learn not only from the learning and teaching activities but also learn from other students and sources recommended. The learning sources include books and scientific articles about extension education, advisory services, case studies in extension and communication of innovations, relevant websites, and the field. Each year, the number of students enrolled in the course is around 135 to 145 students facilitated by five lecturers and two guest lecturers. The learning management per week is 2x50 minutes for lectures plus 3x50 minutes for practicum (various activities, not just in the classroom). There are four classes of practicum managed for the course. Each class practicum consists of 25 students facilitated by a lecturer. The activities during practicum include brainstorming, discussion, case study analysis, field observation, group project on innovative extension, and workshop.

**Product.** The students enrolled in this course should work in groups to produce content and media relevant to a certain contextual issue. The course has started to assign the students to plan and produce content for extension-education content in the last three years following the rapid use of multimedia. By doing so, the students apply the principle of planning and designing messages based on community needs. The content and media chosen by the students are reviewed by the lecturers and assistant lecturers before completing the assignment. The criteria of the assessment include rationale, suitability, creativity, and innovative aspect (Amanah et al., 2022). The students need to formulate content using certain media communication with a maximum of 3 (three) minutes of video to deliver. The final assignment of the video is evaluated using an assessment rubric and peer group assessment. The criteria to measure the final product from the group project are the relevancy to the course of KPM121C, the message clarity, group collaboration, and the student's ability in explaining the content. Topics of student projects include education for all, food and agriculture, healthcare, nature, environment, and about intercultural communication.

### B. Course Development

To improve the achievement of learning outcomes, IPKOIN courses make improvements, and updates to course content and learning processes. The module application through course.ipb.ac.id. began to use more intensively in 2019. There are obstacles in using the moddle, namely not all people be able to take advantage of the features available the course.ipb.ac.id. For this reason, in addition to using courses, WhatsApp group courses, zoom, and google drive are also used to help students learn.

Semester Learning Plans (RPS), Online Learning Plans



(RPD), learning contracts, Practicum Events Units, and assessment rubrics have been prepared by the teaching team. The assessment mechanism has been discussed with students at the first lecture/practicum meeting. To build competence as a Change Agent for the Future, as generation Z, when carrying out community service activities or even in the next few years when entering the world of work, change agents will deal with people from different regions, social, economic, and cultural conditions. On that basis, learning innovations in the KPM121C course consist of three areas:

- update course content and include aspects of communication and information technology in learning (including through [course.ipb.ac.id](http://course.ipb.ac.id)),
- design more varied and flexible learning methods to develop the power of innovation, creativity, and collaboration among student
- assessment of student learning outcomes based on various aspects, namely student activities (active involvement), process and group work results (project/case study) in making counselling materials, and innovative communication according to community needs, quizzes, discussions, and exams. middle and end of the semester. The largest proportion of assessments on group activities and work (50%).

The change in the name of the course in the year 2019 was followed up by updating the course content in line with the current development and future challenges. All course topics are complemented by hand-outs that students can study further. In the year 2019, the project group's task was the communication of innovation for problem-solving or extension services using modern media. Group results are presented in the workshop class. The assessment was carried out by the lecturers and peer groups of the students.

### C. Result of Course Assessment

From the pre-coaching assessment of the course KPM121C using the instrument of HPKEM/HKIP (the similar indicators), it was found that after involving in the HKIP, the course KPM121C increased its performance from 75/93 to 85/93 (Fig. 3 and Fig. 4).

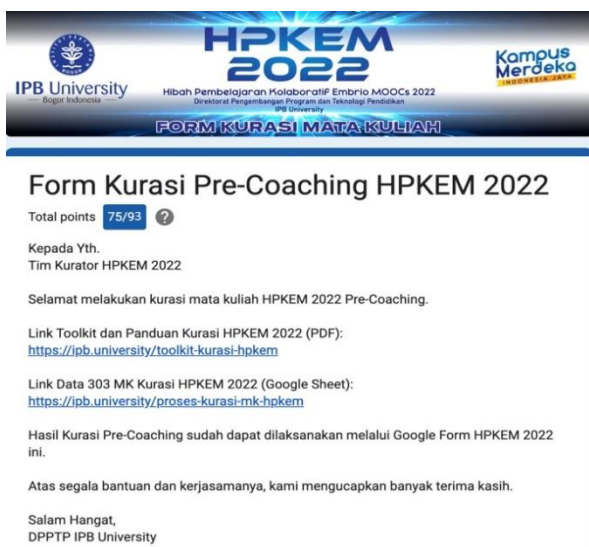


Fig. 3. The results of course assessment using the HPKEM toolkit 2022  
Note: HPKEM stands for Hibah Pembelajaran Kolaboratif Embrio MOOC (Grant for Collaborative Learning Embryo Massive Open Online Courses)



Fig. 4. The results of course assessment using HKIP toolkit 2022  
Note: HKIP stands for Hibah Kompetitif Inovasi Pembelajaran



Fig. 5. The front page of LMS KPM121C as of December 2022

Before the coaching session by the HKIP facilitator to improve the course. Self-assessment of the course using the HPKEM toolkit results in a score 75/93. Some of the indicators were in the below score such as the module for the use of learning media (online), journaling, Turnitin use for checking the student's submission, and technology and learning infrastructure.

After being involved in mentoring and coaching HKIP, the course KPM121C has improved course documents. Figures 4, 5, and 6 show examples of the course website in IPB LMS. The self-assessment of the course resulted in a score of 85/93 at the end of the coaching session of HKIP. The document of the Semester Learning Plan, Semester Online Learning Plan, and Course Assessment Mechanism (Rubric) have been completed. Also, the course information, course team teaching, and course evaluation are clear and included in the LMS. Two items require to complete: a module for media-assisted learning and student journaling or self-reflection on the learning journey.

In the first semester of the academic year of 2022/2023 which commenced in the middle of August 2022, students from other universities enrolled in the course KPM121C as part of the credit-earning program. This initiative is in line

with the National Policy “Freedom to Learn, Independent Campus” (Merdeka Belajar Kampus Merdeka).

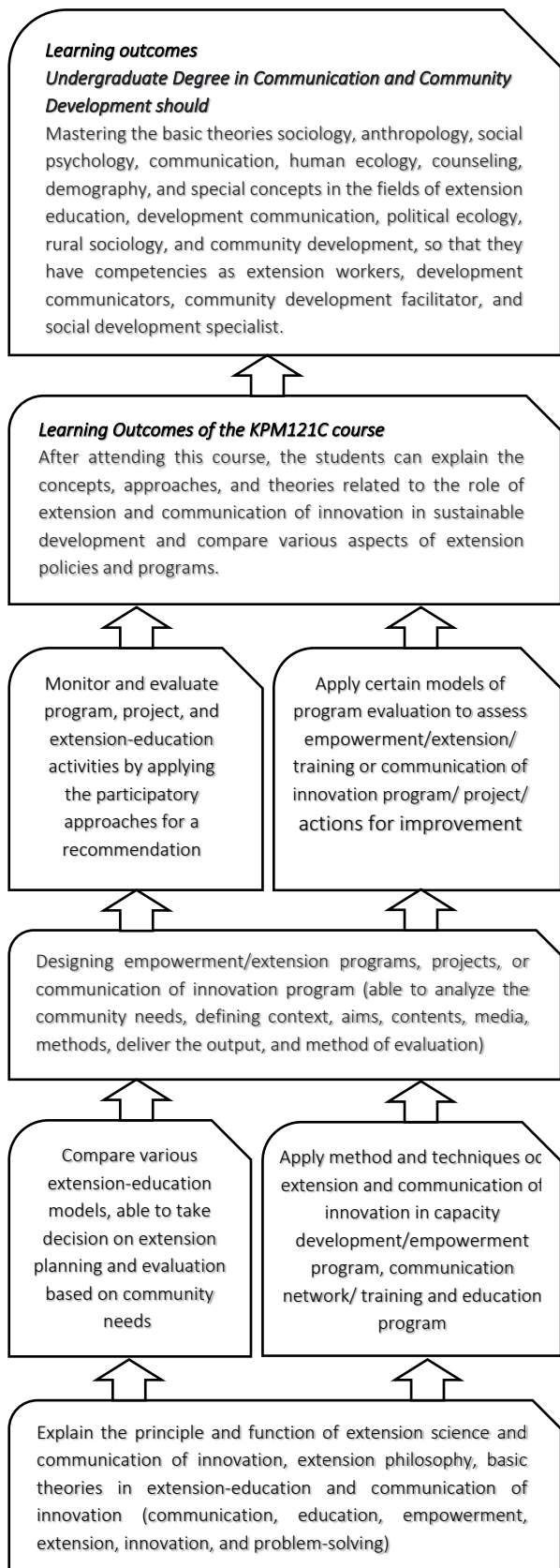


Fig. 6. The learning path for students undertaking KPM121C course

1. Explain the principle of extension and communication of innovation, paradigms, extension methods and media, challenges of extension and communication of future agricultural/development innovations.
2. Explain learning theory, theory of diffusion of innovation and adoption process, the system of communication of innovation in development extension.
3. Design innovative learning/communication programs according to individual/group/family/community needs using certain media including modern media whenever appropriate to the context.
4. Evaluating learning/extension program/communication of innovation program with certain evaluation model.

Fig. 7. The course KPM121C learning outcomes

## V. CONCLUSION

The course KPM121C found that learning innovation is a must to improve the relevancy and learning effectiveness in developing students’ competencies. The use of mixed methods in learning at the university increases students’ ability to reach the learning outcomes. The use of LMS combined with face-to-face learning enhances the learning interaction between lecturers and students.

The insight from our involvement in competition for learning innovation is that the source of knowledge is abundant, however, how the teacher can engage the students to learn from various learning sources is crucial. With a commitment to address future skills, the instructors and the students should ensure that learning is a journey to lead the future.

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