

Development of an integrative flipped classroom model to improve students' critical thinking skills and learning responsibility

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Abstract

Higher education, including accounting learning, often employs conventional learning models that do not optimally involve active learning. This model is unable to facilitate students developing critical thinking skills (CTS) and learning responsibility (LR), so these two abilities are not yet possessed by students adequately. The learning model that is believed to be able to develop CTS and LR is the flipped classroom. This research aims to produce an integrative flipped classroom model (IFCM) that is valid, practical, and effective for improving CTS and LR students, especially in Introductory Accounting learning. IFCM was developed with research and development using four D models, which consist of four development stages: define, design, develop, and disseminate. This paper presents the IFCM, development process in detail and the results at each stage of development, as well as the final product in the form of IFCM which has been proven valid, practical, and effective for improving CTS and LR students in Introductory Accounting learning.

Keywords: *Critical thinking skills; Four D model; Integrative flipped classroom; Learning responsibility.*

Introduction

Implementing innovative learning models that are able to activate students in the learning process is an important thing for lecturers to do. However, active student involvement in the learning process has not been made an integral part of the learning process in many universities because they still apply traditional models (Lubbe, 2016; White et al., 2016). The applied learning model primarily aims to transmit knowledge to lecturers and facilitate students' acquisition of knowledge. Therefore, lecturers and students focus all their energy and attention on achieving this main goal. This makes lecturers and students burdened with various tasks during learning and only have little time for other purposes, namely developing ways of thinking or critical thinking, which tend to be ignored, so they are not taught (Lee & Thathong, 2017).

Universities also widely apply traditional learning models in accounting education. Most of the class time has not been used to actively involve students, even though it has been equipped with problem solving, case analysis, and discussions (Duxbury, Gainor, & Trifts, 2016). The learning model that applies old pedagogy to accounting learning, such as reading books, listening to lectures, and doing assignments and tests by remembering the material that has been given, needs to be replaced with a new model that is more active for students. An integrated case approach is recommended to replace the old model. In this approach, evaluation can be carried out on aspects of students' communication skills, critical thinking, and decision analysis, as well as mastery of quantitative aspects of accounting (Derstine, Emig, & Grant Sr, 2015; Irafahmi, Nuris, Zahroh, & Nagari, 2018).

Various literature studies show that learning models that require students to memorize accounting rules and procedures fail to develop critical thinking skills (CTS). Traditional accounting learning is unable to stimulate creativity and innovative thinking (Thompson & Washington, 2015). This is in line with the opinion of Bonk and Smith who emphasize that memorization is not an appropriate method for studying accounting because it is not effective in preparing accounting graduates with the ability to solve many

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complex business problems. A consultative learning model, using active learning and student-centered learning approach, is considered an effective model for learning accounting because it stimulates student learning and creativity (Irafahmi et al., 2018).

The lack of development of students' CTS is influenced by the learning models applied by lecturers in universities, some of whom still apply conventional methods (Arianti, 2017). Critical thinking can be developed by involving students in active learning (Smith, Rama, & Helms, 2018; Živković, 2016). An accounting learning model that applies a new pedagogy that is able to encourage students to actively carry out investigations in a structured and specific way, as well as develop high-level thinking abilities, needs to be designed to replace the traditional and authoritative way of blindly presenting material. (Lee & Thathong, 2017) expect accounting lecturers to adapt their learning and assessment methods to enhance students' critical thinking skills.

CTS has a positive correlation with learning responsibility (LR) (Abdullah, 2021). Apart from the lack of CTS development for students in accounting learning, much of the literature also explains the lack of student responsibility for learning. In general, students do not have enough CTS and LR to support their learning process. Considering the importance of CTS and LR for students in learning accounting, lecturers need to develop them through learning activities. The results of educational research show that the development of critical thinking is more effective when taught in the context of teaching subject matter content rather than in stand-alone critical thinking learning (Pithers & Soden, 2000). However, the current implementation of learning strategies remains less effective in developing CTS and LR.

The weaknesses that still exist in the accounting learning model encourage innovation to create learning models that can develop students' CTS and LR. One model that is believed to facilitate students developing CTS and LR is the flipped classroom (FC). Currently, the FC model has become popular as a learning model (Bergmann & Sams, 2012; Staker & Horn, 2012; Williams, Horner, & Allen, 2019; Zheng, Bhagat, Zhen, & Zhang, 2020). Theoretically and empirically, FC is able to increase CTS and LR.

From the above arguments, one could conclude that various research gaps were identified, such as research on the application of FC to improve CTS in higher education, which has been carried out, but research and development of the FC model to improve CTS in Accounting course has not been carried out; research on the development of CTS in Accounting course at universities has also been carried out; however, the development of CTS through the application of FC has not been widely carried out; and finally, the application of FC for promoting LR is still very limited and has not been carried out in Accounting course.

Thus, to fulfil the identified gaps of study, there is a need to develop a model by integrating various aspects that can truly facilitate students in developing CTS and LR. Thus, this study is carried out based on Nieveen's (1999) opinion regarding educational product quality criteria, which include three criteria: valid (feasible), practical, and effective. Therefore, this research aims to produce a valid, practical, and effective model named the Integrative Flipped Classroom Model (IFCM) to improve CTS and LR students in Introductory Accounting learning. Specifically, this study describes the complete process of developing the IFCM, from the problem analysis as a background to the development, to testing the effectiveness and dissemination of the IFCM. In addition, the results obtained at each stage of development and the final product will also be presented.

Literature Review

Flipped Classroom (FC) is a learning model that reverses student learning activities. The Flipped Classroom (FC) model shifts group activities from the classroom to the outside, and brings individual activities from the outside into the classroom. Learning activities outside the classroom are carried out before learning in class by studying material provided by lecturers, for example, in the form of video materials, which are delivered through the Learning Management System (LMS) or other platforms. The time available in class that is usually used for listening to lectures is diverted to doing hands-on activities and applying knowledge, which is usually done as homework. Activities in class can be in the form of problem solving, discussion, analysis, and interaction both with lecturers and with other students (Bergmann & Sams, 2012; Nouri, 2016; Osman, Jamaludin, & Mokhtar, 2014; Unal & Unal, 2017).

Theoretically, FC has the potential to develop CTS because it is able to create a constructive learning environment by providing chances for students to be actively involved in learning (Jantakoon & Piriya-surawong, 2018). Constructivism assumes that everyone is an active learner who develops

knowledge for himself (Schunk, 2012). Constructivist learning supports the development of the ability to reason, think critically, understand and use knowledge, self-regulation, and reflection. Vygotsky, with his theory of social constructivism, also emphasizes that CTS develops through social interactions with other people in a social environment (Loudenback, 2019). Thus, a learning approach based on constructivist learning theory is considered appropriate for developing CTS (Allen, 2008). Active learning is the main focus in developing the FC model because actively involving students in the learning process gives them the opportunity to develop their CTS and take their LR (Aidoo, Vesterinen, Macdonald, Gísladóttir, & Pétursdóttir, 2022).

Empirically, many studies have shown that FC is able to facilitate the development of students' CTS in higher education (Andrini, Pratama, & Maduretno, 2019; Chang, Kao, & Hwang, 2020; Chen & Hwang, 2020; Dehghanzadeh & Jafaraghaee, 2018; DeRuisseau, 2016; Huang, 2020; Ibrahim, Khairudin, & Salleh, 2018; Jensen, 2019; Kloppers & Vuuren, 2016; Lee, 2018; Nouri, 2016; Smith et al., 2018; Styers, Van Zandt, & Hayden, 2018). One of the benefits of FC is increasing higher-order thinking skills, including CT (Khlaisang, Teo, & Huang, 2021; Tolbert, 2020), because FC has the potential to create active learning (Smith et al., 2018). The FCM allows lecturers to use more time to involve students in applying knowledge and interact with lecturers and peers to share knowledge and ideas, so as to improve students' abilities in higher order thinking and communication (Chang et al., 2020). Thus, the application of FC will facilitate students in developing CTS (Chang et al., 2020; Hamdan, McKnight, McKnight, & Arfstrom, 2013). FC also provides sufficient time for lecturers to give more personal feedback and help to students, as well as get feedback from students regarding activities carried out and material that has not been understood (Ahmed, 2016).

The implementation of FC also has an impact on increasing student LR. Many students feel they have to take more responsibility for their learning in FC (Nouri, 2016). Huang (2020) research in an English as a Foreign Language (EFL) course reveals that students become more independent after enrolling in a reading course with FC. Student independence increases in terms of assuming more responsibility in class activities, making decisions, and being involved in learning activities outside the classroom. A comparative study between traditional learning and partial application of the FC model in Language processors courses shows that students in the FC group are more responsible for their learning process, so they get significantly better learning outcomes Urquiza-Fuentes (2020).

The Integrative Flipped Classroom Model (IFCM) integrates various aspects both in terms of the basis for model development, learning theory, active learning strategies, and the learning media used. This IFCM integrates four foundations for model development: three learning theories, two learning strategies, and two learning media. IFCM development is based on philosophical, psychological, sociological, and pedagogical foundations. The integrated learning theories are behaviorism, constructivism, and experiential learning. To enhance active learning, the IFCM integrates case-based learning and collaborative learning strategies. Learning activities are also facilitated by learning media in the form of video materials and student workbooks. Model implementation is supported by the use of LMS or other digital platforms, as well as the use of student reflection books. With this integration, it is hoped that the IFCM can further support the development of CTS and LR, as well as being relevant to student characteristics and in accordance with the characteristics of accounting courses.

Research Methodology

Research Design

This research is research and development (R & D). The development model used is the Four D (4D) model proposed by Thiagarajan, Semmel, and Semmel (1974). This model generally consists of four stages, namely (i) Define, (ii) Design, (iii) Develop, and (iv) Disseminate. Each stage in this 4D model consists of several activities. Details of the development stages in the 4D model are described in chart form, as shown in Figure 1.

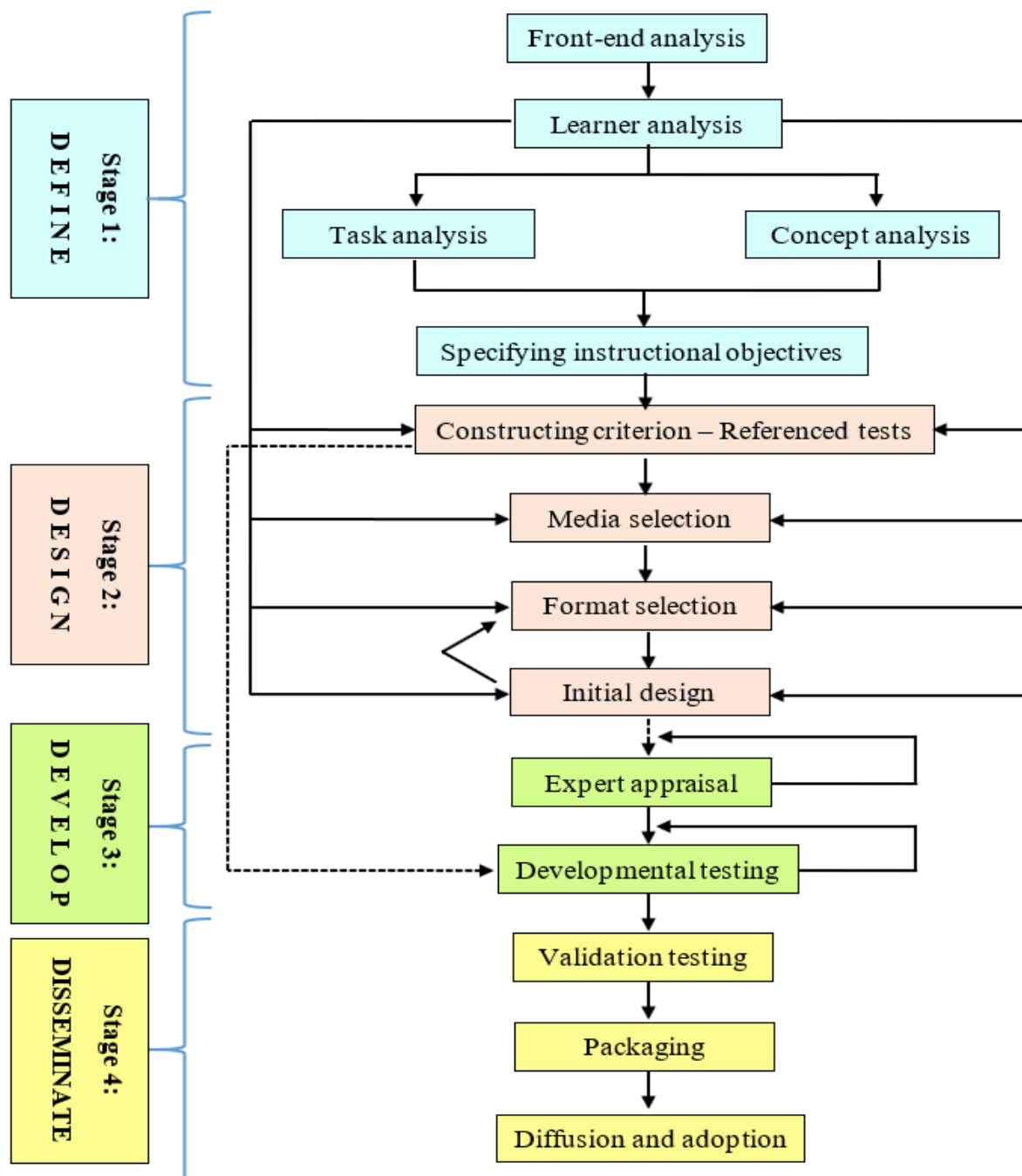


Figure 1. Development stages in the 4D model

Research Procedure

Stage 1:

The defined stage consists of five activities. First, front-end analysis is carried out to analyze the basic problems faced in accounting learning. The analysis of this problem was carried out through literature studies and field studies. Second, student analysis activities are carried out to identify student characteristics that are relevant for model design and development. These student characteristics include initial conditions regarding the student's CTS and LR. Based on the results of student analysis, task analysis and concept analysis were carried out. Third, task analysis is carried out to identify the main skills that students must master and then analyze them into a set of necessary and sufficient sub-skills. The main skills that are expected to develop in students are CTS and LR. These two things are analyzed to find indicators that must be developed in students so that key skills are achieved. Fourth, concept analysis is carried out to identify the main components that must exist and will be designed in a model. To

determine the components of a learning model, refer to [Joyce, Weil, and Calhoun \(2015\)](#). Fifth, determining learning objectives means changing the results of task analysis and concept analysis into formulated objectives expressed in the form of behavior.

Stage 2:

The design stage has four activities. First, the constructing criterion - referenced tests activity carried out the preparation of research instruments, namely instruments to measure learning objectives, which are also the objectives of model development, and instruments for model validation. The second step involves selecting the appropriate media to deliver both the developed model and the learning material. The model delivery medium is determined in the form of a model book equipped with the necessary learning tools. The media for delivering the material are videos and student workbooks. Third, selecting the most appropriate format depends on a number of factors. The learning format includes a combination of media, teaching strategies, and utilization of techniques. In the IFCM, the learning format can be independent or group learning. Fourth, prepare the initial design of the IFCM. Overall, the initial product design and completeness include: 1) IFCM; 2) Learning tools to support model implementation, consisting of a syllabus, workbook, video, reflection book, and model implementation guidebook.

Stage 3:

The development stage includes two activities. First, expert appraisal. Expert assessment is carried out to obtain assessments and suggestions from experts to make improvements to the initial product. Second, Developmental Testing. Development testing is a product design trial activity that has been revised based on expert advice, to target students. The purpose of development testing is to find parts that still require revision and test the practicality of the model. Product revisions are based on various responses, reactions, and comments from students as test subjects.

Stage 4:

The dissemination stage consists of three activities. Before disseminating the product, we first carry out validation testing in the form of a summative evaluation to describe its effect. The data collected in this stage mainly consists of changes in students' CTS and LR. Second, packaging is the stage for packaging learning products in an acceptable form. The characteristics of widely accepted learning products include face validity, completeness, flexibility, and ease of use. Third, diffusion refers to the process through which an individual, group, or system can accept and assimilate a new idea or product.

Product Testing Design

Model testing activities in 4D models consist of two types, namely: a) Developmental testing at the develop stage, and b) validation testing or field trials at the disseminate stage. developmental testing is carried out after the initial product is validated by experts. Developmental testing is a formative evaluation carried out to obtain input or find deficiencies in the IFCM. The data obtained during developmental testing is used to improve the model. The developmental testing was carried out in a limited manner for one class, thus using a one-group pre-test and post-test research design.

Validation testing is a summative evaluation that aims to determine the effects of the model being developed. To determine the effect of the IFCM, testing was carried out using a quasi-experimental design. The experimental class was treated by applying the IFCM, and the control class was given no special treatment. The trial was carried out in the learning process of accounting cycle material for service and trading companies, which required an implementation time allocation of around 10 meetings or 10 weeks, each meeting for 3 hours of lecture at 50 minutes.

Subject, Data Collection, and Research Instruments

IFCM product trials consist of two parts, namely development trials (limited trials) and validation trials (extensive trials). The subjects of the development trial were students participating in the Introductory Accounting course in the Economic Education Study Program, Special Expertise Area of Accounting Education, Faculty of Teacher Training and Education, Sanata Dharma University.

Validation trial subjects were students participating in Introductory Accounting courses at three universities, namely: 1) Accounting Education Study Program, Faculty of Economics and Business, Yogyakarta State University; 2) Accounting Study Program, Faculty of Economics, Sanata Dharma University; and 3) Accounting Study Program, Faculty of Business and Humanities, University of

Technology Yogyakarta. Validation trial subjects consisted of two classes at each university. One class is the experimental group, and the other is the control group. Overall, the number of students in the experimental group was 143, and in the control group, there were 146. The method for selecting samples as test subjects was convenience sampling (non-random sampling). Researchers chose this method to facilitate their access to research subjects.

Data collection was carried out through interviews, filling out questionnaires (scales), and tests. The research instruments used were: 1) an interview guide, used at the define stage; 2) a scale, used at the development and dissemination stage to assess the validity of the model, the practicality of the model, and student LR; and 3) an essay test, used at the development and dissemination stage to measure CTS students.

Data Analysis

Preliminary study data analysis

Data from the preliminary study includes qualitative and quantitative information about students' CTS and LR problems, as well as information about the learning models or strategies used in Introductory Accounting learning. Data from the preliminary study were analyzed descriptively, quantitatively, and qualitatively.

Data Analysis of the Validity of the IFCM and Learning Tools

Qualitative data in the form of suggestions or input for improvement is analyzed descriptively and qualitatively. Quantitative data was analyzed using quantitative descriptive analysis. The data is in the form of assessment data using a Likert scale with four alternatives. Data analysis was carried out by calculating the average score. Validity assessment uses the criteria listed in Table 1 (Widoyoko, 2016).

Table 1. Validity assessment criteria.

Score Interval	Criteria
$x > 3,4$	Very valid
$2,8 < x \leq 3,4$	Valid
$2,2 < x \leq 2,8$	Fairly valid
$1,6 < x \leq 2,2$	Not valid
$x \leq 1,6$	Very Invalid

IFCM Practicality Data Analysis

The practicality of the IFCM was measured using a Likert scale with four scales. The data is analyzed by calculating the average score, which is then converted into a value on a five-point scale. The assessment criteria follow the reference in Table 1, but with interpretations: very practical, practical, quite practical, less practical, and not practical.

Analysis of IFCM Effectiveness Data

The effectiveness of the IFCM is known from the results of the data analysis of students' CTS and LR measurements. This data was analyzed using descriptive analysis and statistical inference. The inference statistics used are the T test if the data is normally distributed and the Man Mann-Whitney U-test or Wilcoxon test if the data is not normally distributed. In the effectiveness test, Normalized Gain analysis was also carried out.

Results & Discussion

Stage 1: Define

At the define stage, data was obtained regarding problems related to the application of learning models in accounting learning, as well as problems regarding the weak CTS of students in accounting and LR students in tertiary institutions. From the literature study, it was found that in general there are several characteristics of the learning model that has been applied in accounting learning in higher education, namely: 1) not involving students actively in the learning process (Lubbe, 2016; White et al., 2016) although has been equipped with problem solving, case analysis, and discussion (Duxbury et al., 2016); 2) lecturers tend to have the main goal of conveying knowledge and students gaining knowledge, so that the goal of developing ways of thinking or critical thinking tends to be ignored/not taught (Lee & Thathong,

2017) tends to require students to memorize accounting rules and procedures so that they fail to develop critical thinking skills and are unable to stimulate creativity and innovative thinking (Thompson & Washington, 2015) 4) still applying old pedagogy in accounting learning, such as reading books, listening to lectures, and doing assignments and tests by remembering the material that has been given, so it needs to be replaced with a new model that is more active for students (Derstine et al., 2015).

From the analysis of several international journal articles, it is indicated that CTS for students in accounting and LR students in general is relatively inadequate and important to develop (Abdel Razeq, 2014; Allan, 2006; Carpenter & Pease, 2013; Gautam, Jangam, & Loh, 2018; He, Craig, & Wen, 2013; Irafahmi et al., 2018; Kinyaduka, Kalimasi, & Heikkinen, 2019; Sin, Jones, & Wang, 2015; Thompson & Washington, 2015; Wolcott & Sargent, 2021).

In Indonesia, CTS for accounting students is also relatively low. This is known from four research articles published in national journals. The research was conducted at: 1) Three universities in Bandar Lampung (Pujiati, 2015) 2) State University in Malang (Arianti, 2017) 3) Private universities in Riau (Wijaya, 2021); 4) Private universities in Medan (Wahyuni & Amalia, 2022).

Surveys were conducted with both lecturers and students at six universities in Yogyakarta, Indonesia. Respondents in this survey consisted of 13 lecturers teaching Introductory Accounting courses and 140 students who had taken Introductory Accounting courses in the previous semester. The results of surveys and interviews with lecturers show that: a) the learning model that has been implemented has not optimally activated students to be involved in learning; b) most students' CTS and LR are in the good category, but some are still in the adequate category, so they still need to be improved.

From task analysis activities, aspects and indicators of CTS and LR are produced. The CTS aspects developed are the top three abilities from Bloom's Taxonomy, namely the ability to analyze, evaluate, and create. The formulation of indicators for each aspect is adjusted to each material topic. The LR aspects developed consist of five aspects, namely: 1) Orientation to lectures and learning; 2) Active participation in learning; 3) Autonomy and control of learning; 4) Initiative; 5) Management of learning resources (Allan, 2006)

The process of concept analysis identifies the key components that the developed IFCM should include. Concept analysis refers to Joyce et al. (2015).

Table 2. Results of IFCM concept analysis.

Components	Component details
Syntax	Connection → Quiz → Exploration → Construction → Reflection → Expression
Social System	Democratic, Collaborative, Interactive
Principle of Reaction	<ul style="list-style-type: none"> a) The main role of the lecturer is as a facilitator. b) Lecturers provide motivation, stimulation, appreciation, and opportunities to participate and interact. c) Lecturers maintain an intellectual atmosphere and dialectical style during discussions. d) Lecturers encourage cooperation, provide an assistance, guidance and direction.
Support System	<ul style="list-style-type: none"> a) Learning material videos b) Workbook c) Syllabus d) Reflection Book e) Learning Management System/other platforms. f) IFCM Implementation Guidebook. g) IFCM Book
Effects	<ul style="list-style-type: none"> a) Instructional: The improvement of students' CTS and LR. b) Nurturant: Independence in learning, learning motivation, learning satisfaction, ability to work together and communicate.

Based on the results of the task analysis and concept analysis, learning objectives are formulated, which are expressed in behavioral form. In the formulation of the learning objectives there is also a formulation of the objectives for developing the model. The learning objectives that are formulated and will be achieved through the application of the IFCM in Introductory Accounting Learning are as follows: 1) Understand the process of preparing company financial statements; 2) Have the skills to prepare financial

reports for service companies and trading companies; 3) Have CTS in the process of preparing financial reports for service and trading companies; 4) Have better LR.

Stage 2: Design

At this stage, various instruments are produced in the form of tests and questionnaires, which can be grouped into three parts, namely: 1) instruments to measure CTS and LR; 2) instruments to validate models and supporting tools; and 3) instruments to validate tests and questionnaires.

The media required and produced in developing this IFCM are media for delivering the model and supporting media for implementing the model. The media for delivering the IFCM is in the form of an IFCM book, and supporting media for implementing the IFCM are in the form of: 1) lesson plans; 2) learning material videos; 3) student workbooks; 4) student reflection books; and 5) model implementation guidebooks.

In developing the IFCM, the learning format chosen was independent and group learning. Independent learning is carried out when students are outside of class via video media or other sources. Group learning is carried out when students take part in face-to-face learning in the classroom by integrating case-based learning and collaborative learning. Group learning can also be done when students are outside the classroom.

The final activity in this stage is designing the initial product. The products produced in this activity are IFCM prototypes, along with supporting product prototypes.

Stage 3: Develop

Expert appraisal

The activity carried out at the development stage is the process of validating the IFCM by experts. Likewise, validation is carried out on the instruments used to validate the model and to measure the practicality and effectiveness of the model. Suggestions from experts are used as input for making revisions. A summary of the validation results of the IFCM and learning tools by experts is shown in [Table 3](#).

Table 3. Summary of product validation results by experts.

Validated Products	Validator	Average score	Criteria
IFCM	3 model experts	4.00	Very valid
	2 material experts	3.79	Very valid
Material Videos	4 material experts	3.53	Very valid
Student Workbook	4 material experts	3.67	Very valid
Student Reflection Book	3 learning experts	3.91	Very valid
Syllabus	2 learning experts	3.84	Very valid
IFCM Implementation Guidebook	3 model experts	3.79	Very valid
IFCM Book	3 model experts	3.92	Very valid
CTS Test (Question quality)	6 experts	3.83	Very valid
CTS Test (Content validity)	6 experts	3.75	Very valid
LR Scale (Question quality)	6 experts	3.80	Very valid
LR Scale (Content validity)	6 experts	3.77	Very valid
IFCM Validity Scale for model expert	2 experts	3.71	Very valid
IFCM Validity Scale for material expert	2 experts	3.97	Very valid
IFCM Book Validity Scale	2 experts	3.68	Very valid

Developmental testing

Developmental testing was carried out on a limited basis in one Introductory Accounting class consisting of 47 students, in the Accounting Education Study Program, Faculty of Teacher Training and Education, Sanata Dharma University. Each topic begins and concludes with a CTS pre-test and post-test. At the beginning and end of the model implementation, we provide the student with the LR measurement scale.

From developmental testing activities, data on the practicality of the model, CTS pre-test and post-test results, and data from the LR scale were obtained. The practicality of the IFCM is assessed through the implementation of syntax, social systems, reaction principles, and support systems. The results of the practicality test of the IFCM, according to students, show that the FC model is considered very practical,

with a score of 3.64. Meanwhile, according to the lecturer's assessment, the IFCM is considered practical with a score of 3.32.

The test to measure CTS was carried out to see the impact of the IFCM on increasing student CTS. For each learning material, a pre-test and post-test are carried out. From three tests, the average pretest score was 32.34 and the posttest was 65.19. The average CTS pre-test and post-test scores were then analyzed using a paired sample t-test to find out whether the difference was significant or not. Previously, a data normality test was carried out using the Shapiro Wilk test, and the results showed that the data distribution of pre-test and post-test scores was normally distributed with a Sig value. = 0.337, greater than 0.05.

Based on the results of the paired sample t-test, it can be concluded that the difference in pre-test and post-test scores is significant (Sig. < 0.05). This means that students' CTS before and after participating in learning with the IFCM is significantly different. From the pre-test and post-test scores, an average N-gain score of 0.54 was calculated, which is included in the moderate improvement category (Hake, 1998).

The LR scale is filled in by students twice, at the beginning and at the end of learning, by applying the IFCM. Data from this questionnaire is used to see the impact of the IFCM on increasing students' LR. The average initial score was 109.05, and the final score was 17.66.

The average score data from the students' initial and final LR scales was then analyzed statistically using a paired sample t-test to determine whether the differences were significant or not. Previously, a data normality test was carried out using the Shapiro Wilk test, the results of which showed that all data groups were normally distributed.

Based on the results of the paired sample t-test, it can be concluded that the LR of students before and after participating in learning with the IFCM is significantly different. From the initial and final questionnaire scores, an average N-gain score of 0.31 was calculated, which is included in the moderate improvement category.

Stage 4: Disseminate

Validation testing

Validation testing produces data: 1) a practicality test, 2) test the effectiveness of the IFCM for increasing student CTS and LR. The results of the data analysis on the practicality of the IFCM in extensive tests are presented in Table 4.

Table 4. Practicality test results of the IFCM in validation testing.

Model Component	According to Students		According to Lecturer	
	Average Score	Criteria	Average Score	Criteria
Syntax				
Connection	3.42	Very practical	3.69	Very practical
Quiz	3.78	Very practical	3.75	Very practical
Exploration	3.39	Practical	3.50	Very practical
Construction	3.44	Very practical	3.92	Very practical
Reflection	3.22	Practical	3.13	Practical
Expression	3.33	Practical	3.75	Very practical
Average Syntax score	3.43	Very practical	3.62	Very practical
Social System	3.47	Very practical	3.80	Very practical
Principle of Reaction	3.53	Very practical	4.00	Very practical
Support System	3.67	Very practical	3.92	Very practical
Average	3.52	Very practical	3.83	Very practical

Descriptive statistics of CTS pre-test and post-test scores are shown in Table 5.

Table 5. Descriptive statistics of CTS pre-test and post-test scores

Group	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Experiment	138	42.64	19.68	79.80	13.35
Control	129	32.57	13.73	51.89	16.47

Based on the pre-test and post-test scores, the effectiveness of the IFCM was tested to increase student CTS. The effectiveness test was carried out using several stages of statistical analysis of difference tests, namely comparing: 1) pre-test between the experimental group and control group; 2) pre-test with post-test in the experimental group and control group; 3) post-test between the experimental group and the control group; and 4) the gain of the experimental group with the control group (Spathopoulou, 2022; Sukmadinata, 2006; Widiana, Parwata, Jampel, & Tegeh, 2024). Apart from that, a Normalized Gain Score analysis was also carried out.

Before carrying out the different test analysis, a data normality test was carried out using the Kolmogorov-Smirnov Test. Data analysis was carried out with Wilcoxon or Mann Whitney U if all data groups had a non-normal distribution, and with the t-test if all data groups had a normal distribution. The results of different test data on students' pretest and posttest CTS scores are summarized in Table 6, and the results of the N gain analysis in Table 7.

Table 6. Summary of test results for differences in CTS for experiment class and control class students

Data Group	Statistic test	Difference Test Results
Pre-Test Experiment - Control	Mann Whitney U test	Different (Sig. = 0,000)
Post-test Experiment - Control	Mann Whitney U test	Different (Sig. = 0,000)
Pre-Post Experiment	Wilcoxon test	Different (Sig. = 0,000)
Pre-Post Control	Wilcoxon test	Different (Sig. = 0,000)
Gain Experiment-Control	Independent sampel t test	Different (Sig. = 0,004)

Table 7. CTS score N-gain analysis results.

Group	Pre-Test	Post-Test	N-Gain	Criteria
Experiment	42,64	79,80	0,66	Moderate (< 70)
Control	32,57	51,89	0,29	Low (< 30)

Descriptive Statistics of LR Pre-test and Post-test Scores are shown in Table 8.

Table 8. Descriptive statistics of LR pre-test and post-test scores.

Group	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Experiment	114	111,14	12,372	120,87	10,629
Control	100	110,87	11,663	115,75	12,274

Testing the effectiveness of the FC model for increasing student LR was carried out using several stages of statistical analysis of difference tests, such as testing the effectiveness of the IFCM for increasing CTS. The results of the LR data normality test indicate that all data is normally distributed. Thus, data analysis was carried out using paired sample t-test. The results of different test data on students' pretest and posttest LR scores are summarized in Table 9.

Table 9. Summary of test results for differences in LR for experimental class and control class students

Data Group	Statistic test	Difference Test Results
Pre-Test Experiment - Control	Independent sampel t test	Same (Sig. = 0,870)
Post-test Experiment - Control	Independent sampel t test	Different (Sig. = 0,001)
Pre-Post Experiment	Paired sampel t test	Different (Sig. = 0,000)
Pre-Post Control	Paired sampel t test	Different (Sig. = 0,000)
Gain Experiment-Control	Independent sampel t test	Different (Sig. = 0,000)

An N-Gain analysis was carried out to measure the increase in LR between before and after the learning process. The results of the N-Gain analysis are presented in Table 10.

Table 10. N-gain LR analysis results.

Group	Pre-Test	Post-Test	N-Gain	Kriteria
Experiment	111,14	120,87	0,32	Moderate (< 70)
Control	110,87	115,75	0,18	low (< 30)

The results of the analysis of student CTS and LR measurement data show that the FC model can improve student CTS and LR.

Packaging, Diffusion, and Adoption

This activity is carried out by designing attractive covers for IFCM books and other supporting products. Diffusion and adoption activities are carried out by disseminating the IFCM through scientific seminars, publishing articles in international journals, and publishing IFCM books with ISBN.

Final Product

Conceptual IFCM

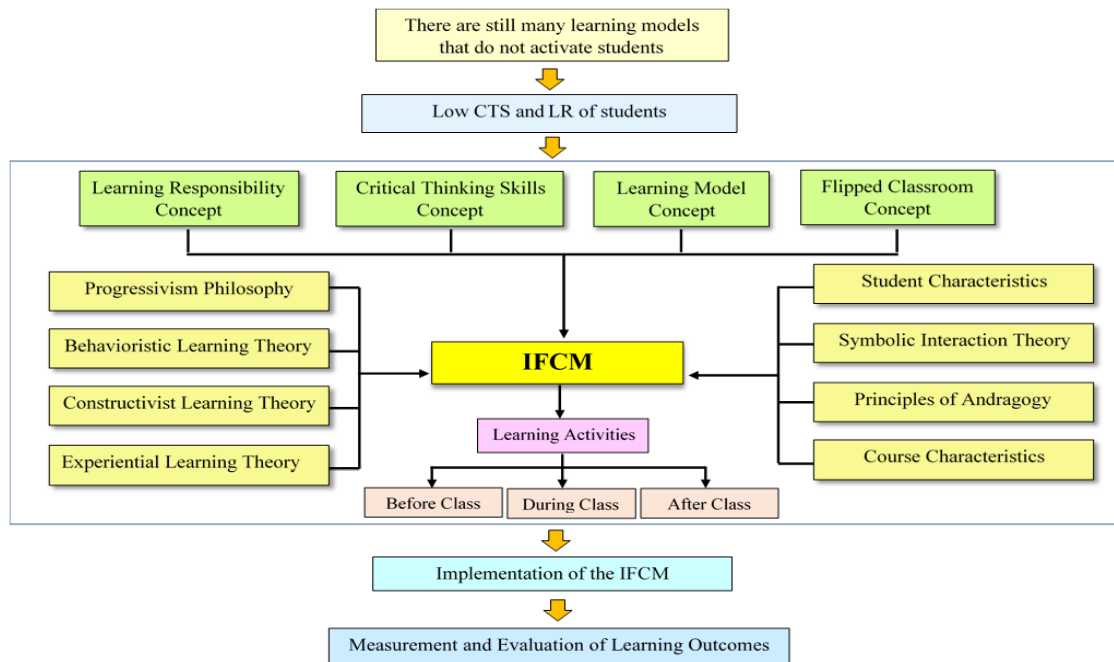


Figure 2. Conceptual IFCM.

The IFCM was developed based on the philosophy of progressivism as a philosophical foundation. The contribution of the philosophical foundation in developing the IFCM is realized by designing student-centered learning (SCL) (Gutek, 1988; Jalaluddin & Idi, 2012) and is democratic in nature (Fadlillah, 2017). Active learning is the main focus in developing this model because actively involving students in the learning process gives them the opportunity to take their LR and develop their CTS (Aidoo et al., 2022). Therefore, in the IFCM, at each stage of learning, students are given the opportunity to be actively involved both individually and in groups, both outside the classroom and inside the classroom. Another implementation of the progressivism philosophy is that students are developed optimally by being given as much learning experience as possible and trained to have the ability to solve cases (Fadlillah, 2017; Muhmidayeli, 2011).

The IFCM was developed based on learning psychology and developmental psychology as psychological basis. The psychological foundation of learning involves three learning theories, namely behavioristic, constructivist, and experiential. The foundation of developmental psychology is applied by considering the characteristics of students in adolescence and early adulthood.

Behavioristic theory explains that learning is a process of stimulus-response interaction (Budiningsih, 2005). The contribution of behaviorist theory to the IFCM is realized by providing stimuli to students in the form of learning material videos and student workbooks every time they enter a new subject. The stimulus in the form of providing workbooks is intended so that students can experience the learning process more actively, not only by watching videos but also while working on worksheets. According to behavioristic theory, providing reinforcement is an important factor in the learning process (Budiningsih, 2005; Zhou & Brown, 2017). To strengthen the learning activities carried out by students outside of class, quizzes are held before class learning. With quizzes, students are expected to become more motivated to study the material or prepare themselves for learning in class. The quiz score achieved by students can be one of the assessment points, which can also function as reinforcement. Behavioristic theory also emphasizes the importance of habituation and discipline (Budiningsih, 2005; Palardy, 1988). To ensure

that the learning activities that have been designed in the IFCM can be carried out by students, lecturers need to always discipline and get students used to doing the tasks given, so that the responses that occur are as expected.

The IFCM applies constructivist learning theory because a constructivist learning environment that emphasizes active learning really supports the development of CTS and LR (Aidoo et al., 2022; Allen, 2008; Jantakoon & Piriya-surawong, 2018; Karagöl & Emrullah, 2019; Kwan & Wong, 2015). The contribution of constructivist theory in the IFCM is realized by providing opportunities for students to study independently outside the classroom through video learning materials and other resources, while also working on student workbooks. In independent learning activities outside of class, students construct their own knowledge actively, by connecting the knowledge they already have with new information (Budiningih, 2005; Kwan & Wong, 2015), which is obtained through video materials or other sources.

Constructivist theory, especially social constructivism, is also applied in the IFCM by integrating CL and CBL (Idaresit Akpan, Angela Igwe, Blessing Ijeoma Mpmah, & Onyinyechi Okoro, 2020), especially in the construction stage. The application of these two active learning strategies is realized in group discussion activities with heterogeneous members to solve practice questions and cases. The application of social constructivism theory allows students to interact with fellow students and lecturers in order to form knowledge and develop their CTS. Social constructivism also played a role in the development of LR. Social constructivism shifts responsibility for acquiring knowledge from lecturers to students, while changing students from being passive listeners to active participants, as well as knowledge builders among their colleagues (Idaresit Akpan et al., 2020; Loudenback, 2019).

The IFCM also applies experiential learning theory (ELT). In practice, there is a close relationship between FC and ELT, where both emphasize the importance of active learning (Chen, 2021). ELT's contribution to the IFCM is realized by providing learning experiences through various learning activities designed at each learning stage, and then reflecting on these learning experiences. Reflection is able to maximize learning by connecting concrete experiences with abstract lessons (Ahmed, 2019).

Apart from being based on learning psychology, the development of the IFCM is also based on developmental psychology. The IFCM was developed by considering student characteristics. Students who are at the beginning of their study period in college are individuals who are in the transition period between late adolescence and early adulthood (Kail & Cavanaugh, 2010; Yusuf, 2012). In terms of cognitive development, students have entered the final stage of Piaget's cognitive development stage, namely the formal operational stage, so that students have the ability to reason logically about abstract and hypothetical things, solve problems systematically, make decisions, think critically, and be reflective (Boyd & Bee, 2015; Santrock, 2011).

The IFCM was developed based on the theory of symbolic interactionism (Ahmadi, 2008; Mulyana, 2001; Siregar, 2011) as a sociological basis. The contribution of the sociological basis in developing the IFCM is, among other things, realized in designing a learning process that accommodates student interaction and communication with the social and physical environment. Students are enabled to interact and communicate with lecturers and fellow students both in learning activities outside the classroom and inside the classroom. Interaction with the physical environment occurs when students learn through various media, such as video materials, workbooks, LMS, and WAG. The IFCM is based on the principles of andragogy as a pedagogical foundation. The development of the IFCM considers two of the four principles of andragogy proposed by Knowles et al. (2005), namely: 1) experience is the basis of learning activities; and 2) learning is more problem-centered and requires encouragement and motivation. The first principle is realized by designing learning activities at each learning stage to provide the optimal learning experience possible so that students truly experience the learning process. The second principle is realized by integrating CBL to train students to solve problems that may occur in real practice. In addition, andragogy is based on self-learning methods for adults. This direction to become an independent learner is a factor that can encourage self-responsibility in an adult learning environment, so that it can empower adult learners to accept responsibility for their learning (Lazarus & Ferris, 2016)

The IFCM is based on the concept of active learning, as an implication of the application of constructivist and experiential learning theories (Chen, 2021; Neto, de Sousa Gomes, & Tilton, 2017) Active learning is implemented by integrating CBL and CL strategies (Misseyanni, Lytras, Papadopoulou, & Marouli, 2018). Active learning is an important component for developing CTS (Dehghanzadeh & Jafaraghaee, 2018; Phala & Chamrat, 2019) and LR (Aidoo et al., 2022; Urquiza-Fuentes, 2020). The CBL and CL were

chosen to be integrated into IFCM because these two strategies are able to increase CTS. Several studies show that CTS can be improved by implementing CBL (Roza & Luthan, 2022; Sapeni & Said, 2020) and CL (Loes & Pascarella, 2017; Ramdani & Susilo, 2022).

The IFCM was developed by considering the characteristics of the course where this model will be implemented. The Introductory Accounting course material generally examines the basic concepts of accounting and the process of preparing company financial reports. Therefore, introductory accounting learning includes theory and practice, so that the learning activities and learning media designed can facilitate students mastering the material, both through understanding theory and practicing working on practice questions and cases. Learning using cases is effective in helping students understand basic accounting concepts (Bailey & Samuels, 2018).

IFCM

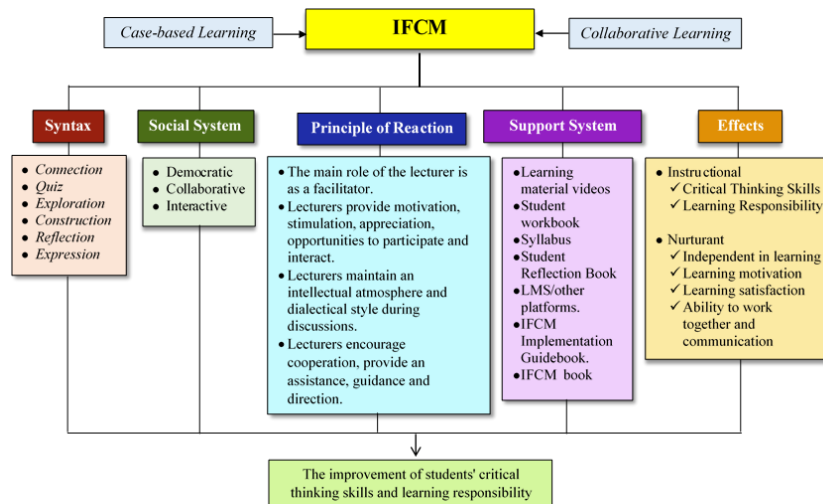


Figure 3. IFCM (1).

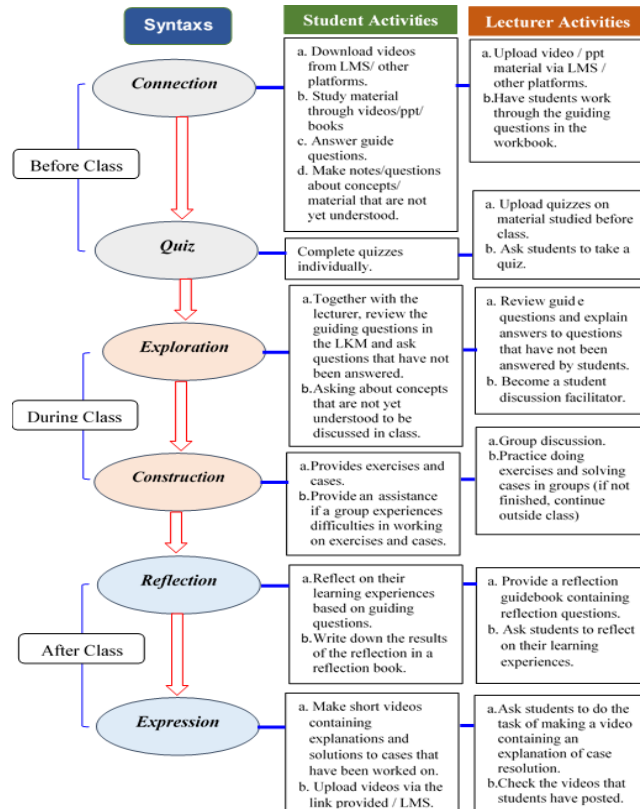


Figure 3. IFCM (2)

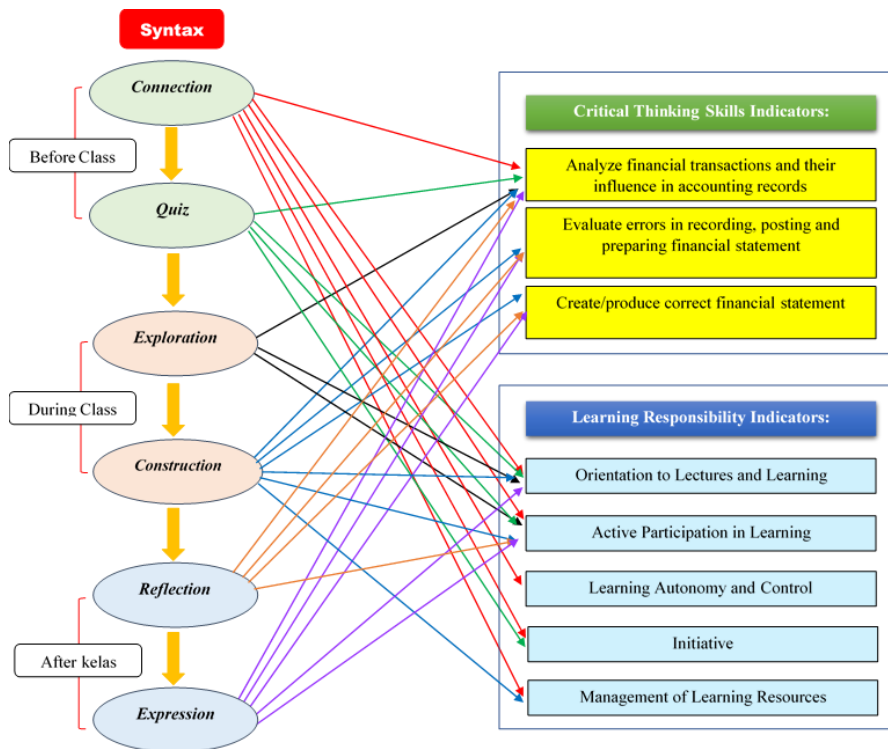


Figure 3. IFCM (3).

IFCM Components

Syntax

The IFCM syntax consists of six stages of learning activities, each of which is named the Connection, Quiz, Exploration, Construction, Expression, and Reflection stages.

At the Connection stage, student activities involve learning new concepts or material and connecting them with the knowledge they already have. Apart from that, at this stage there is a relationship between stimulus and response, where students are given stimulus in the form of videos and workbooks, as well as information about quizzes, to stimulate students to want to learn to prepare themselves before learning in class.

The quiz is intended to measure the extent to which students have understood the material in the videos they have studied. Giving quizzes is also intended to motivate students to study the material before learning in class. Apart from that, by giving quizzes, lecturers have the opportunity to provide incentives in the form of points or certain scores to students.

In the Exploration phase, students are given the opportunity to deepen their understanding of the material they have studied outside of class. The workbook provides students with the opportunity to express the challenges they encounter when answering the guiding questions. Students also have the opportunity to voice any questions that come up during the discussion.

In the construction stage, students apply the understanding they have gained in the previous stages by practicing doing exercises and solving cases. In this process, students gain knowledge about concepts and procedures in accounting through direct, practical experience. By working on cases, students are facilitated in developing their CTS. Small groups engage in discussions to solve practice questions and cases

At the reflection stage, students reflect on the learning experiences they have had based on reflection guiding questions. Students are directed and guided to remember or reflect on the various learning experiences they have experienced, both related to cognitive processes and the values or meaning that can be found from these experiences. This reflection activity helps students realize the extent of the understanding or knowledge they have acquired.

The expression stage of student activity is to express the understanding they have gained from the previous stage by making a group video presentation about what they have understood from the practice of solving cases and reflecting on it. Students engage in this activity to enhance their understanding of the knowledge they gained in the preceding stage.

Social system

The social system refers to the pattern of relationships that occur between lecturers and students during the learning process. The social system shows the roles of lecturers and students and the rules that apply. The type of social system that is expected to occur is usually related to the learning approach or strategy applied. In this IFCM, the social system to be built is adapted to the concept of the FC approach, which integrates CBL and CL strategies. The IFCM, designed to develop CTS and LR, creates a democratic and collaborative social system in an interactive classroom environment.

A democratic social system is an embodiment of active learning, which is the focus of implementing the FC approach. A collaborative social system is built into classroom learning, especially at the Construction stage. This social system needs to be created to support the implementation of CBL and CL strategies. Interaction between students in groups is an important activity to strive for so that the learning process occurs through exchanging information or opinions. Interaction between lecturers and students is also an absolute must. The direct presence of lecturers is really needed to accompany, motivate, provide feedback, or provide reinforcement.

Principle of Reaction

The reaction principle is a direction for lecturers to demonstrate how to appreciate and respond to student responses. With this reaction principle, the lecturer listens to the students and chooses the appropriate response to what they do. In the IFCM, the main role of the lecturer is as a facilitator. To support learning activities outside of class, namely at the Connection stage, lecturers motivate students to prepare themselves for learning in class by studying material through videos. Students' thinking processes need to be directed by stimulating them using questions that can encourage them to think more critically. To provide appreciation for learning activities that have been carried out outside the classroom, lecturers provide assessment points by giving online quizzes before face-to-face learning (Quiz stage).

During class learning, lecturers provide ample opportunities for students to participate and interact actively with fellow students and lecturers. At the Exploration stage, the lecturer encourages students to dare to express opinions and questions that arise during class discussions. In this case, lecturers strive to maintain a strong intellectual climate where all opinions or views expressed by students are respected and avoid direct evaluation of student opinions (Alghazo, Rababah, & Malkawi, 2023; Ateş & Khameneh, 2023; Aydin, Aydin, Ozreberoglu Kirikkaleli, & Serol, 2023; Joyce et al., 2015). At the Construction stage, lecturers also encourage students to work together and discuss with friends in groups when doing practical work and solving cases. Lecturers also monitor the extent to which students have completed their work.

In activities after face-to-face in class, the lecturer encourages and directs students to reflect on the learning experiences they have experienced to find abstractions of knowledge, values, or meaning from these experiences, as well as intentions to carry out them. Meanwhile, at the Expression stage, lecturers need to provide guidelines about what students need to express and how to express it. Lecturers also need to monitor and provide incentives in the form of assessment points.

Support system

This video contains Introductory Accounting learning material prepared by the lecturer to support student learning activities before class. Students study material via video individually at home in preparation for taking part in class learning. The material packaged in this video is mainly for material that requires low-level thinking skills (remembering and understanding).

Workbooks are provided to facilitate student learning activities at each learning stage. The workbook consists of two parts. Part I, Introduction, contains learning stages, learning outcomes, information about workbook and instructions for using it. Part II Student Worksheets contains various student learning activities at each learning stage, from the Connection stage to the Expression stage.

The IFCM is equipped with a syllabus prepared by applying the IFC concept. Therefore, this syllabus explicitly identifies learning activities carried out outside the classroom and inside the classroom. The syllabus is used as a guide for lecturers in implementing the IFCM.

LMS/other platforms are used as a means to assist communication between lecturers and students, especially for learning activities outside the classroom. Lecturers use this LMS, among other things, to upload video material, provide quiz questions, and creat discussion forums. On the other hand, students will use the LMS to access video materials, quiz questions, discussion forums, and upload assignments.

The student reflection book serves as a guide to facilitate students' reflection on their learning experiences. This book, which contains the stages of reflection and guiding questions for reflection, is used in the reflection stage. In the provided space, students write the results of their reflections.

The model implementation guidebook is designed as a guide for lecturers teaching Introductory Accounting courses who will implement the IFCM. This book contains, among other things, an explanation of the IFCM and learning stages, as well as student learning activities and lecturer activities at each learning stage.

The IFCM book contains a thorough explanation of the IFCM, which is designed to improve students' CTS and LR in the Introductory Accounting course. The model book is entitled: FLIPPED CLASSROOM INTEGRATIF. Konsep, Teori, dan Implementasinya dalam Pembelajaran Akuntansi Pengantar (INTEGRATIVE FLIPPED CLASSROOM. Concepts, Theories, and their Implementation in Introductory Accounting Learning.



Figure 4. Support system.

Instructional and Nurturant Effects

The IFCM was developed to provide an instructional impact in the form of increasing student CTS related to Introductory Accounting course material, as well as increasing student LR. Meanwhile, the implementation of the IFCM is also expected to provide accompanying impacts, including learning independence, learning motivation, learning satisfaction, and the ability to work together and communicate (Nugraheni, Sukirno, Hendrowibowo, & Aji, 2022).

Conclusions

IFCM was developed through research and development using the 4D model, which includes the define, design, develop, and disseminate stages. The IFCM is considered very valid by learning model experts and by Introductory Accounting material experts. Likewise, the support system for model implementation, namely lesson plans, video materials, student workbooks, student reflection books, model implementation guidebooks, and IFCM books, is considered very valid by experts. From the practical aspect, IFCM is considered very practical by students in limited and extensive tests. Meanwhile, lecturers assess that it is practical for limited tests and very practical for broad tests. Research has proven that IFCM effectively increases students' CTS and LR in introductory accounting learning.

From this research, it is known that CTS and LR can be improved by implementing a learning model that emphasizes active learning. Active student involvement is the main factor in developing student competence. Therefore, in further research and development aimed at developing learning models, it is necessary to pay attention to the active learning aspect, by integrating various learning methods or strategies that involve students actively in the learning process.

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