

Implementing The Ignatian Pedagogy Paradigm in Mathematics Learning: Annuity Material at The Vocational School Level

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Abstract. The Ignatian Pedagogy Paradigm with a Problem-Based Learning (PBL) approach is expected to provide a meaningful learning experience. This study aims to determine the implementation of PBL using the Ignatian Pedagogy cycle in vocational school students' mathematics learning of Annuity material. The results of the study show that implementing this learning has succeeded in creating meaningful learning experiences. This learning connects the material with real situations as context excavation, group discussions in building learning experiences, learning reflections, and the presentation process as actual actions. This learning was evaluated using the 4C (Competence, Conscience, Compassion, and Commitment) principles. The Ignatian spirituality contained in this learning is Cura personalis and lifelong learning. Implementing the Ignatian Pedagogical Paradigm through PBL helps students understand the topic that they learn and builds a person who is reflective, responsible, and ready to face future challenges.

1 Introduction

Education is very important in improving the quality of human resources (HR), which intends to develop individuals holistically, including aspects of spiritual and social attitudes, knowledge, and skills. More than just transferring knowledge, education has a moral responsibility to create individuals who can think critically, act wisely, and adhere to noble values. However, learning practices are often oriented towards rote memorization and purely academic achievement, losing meaning and relevance. Especially in mathematics learning, where abstract concepts are frequently taught without a clear connection to the real world, students need help understanding the significance of this science in everyday life. Therefore, an approach is required to provide a meaningful learning experience while shaping student character.

The Ignatian Pedagogical Paradigm (IPP) offers a holistic approach that emphasizes the development of competence, awareness, empathy, and commitment to learning. With the 4C (Competence, Conscience, Compassion, and Commitment) principles, the Ignatian Pedagogical Paradigm integrates cognitive, emotional, and spiritual aspects [1]. The Ignatian Pedagogy Paradigm is applied through a cycle of context, experience, reflection, action, and evaluation to accompany the learner in understanding truth and exploring human values. This

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pattern is central to Jesuit education aimed at forming competence, responsible, and compassionate individuals. With this approach, teachers can help students develop holistically through a meaningful learning process involving the dynamics of Ignatian Pedagogy, as shown in the following scheme [2].

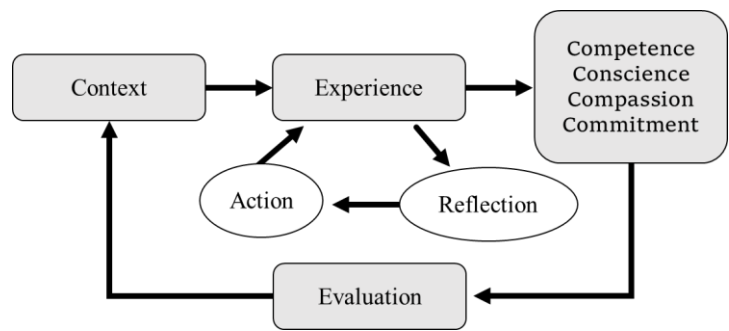


Fig. 1. Dynamics in the Ignatian Pedagogy Schema

One learning model that aligns with Ignatian Pedagogy is Problem-Based Learning (PBL). The model also focuses on reflective, contextual, and meaningful learning. In PBL, students are invited to solve real problems relevant to their lives to develop critical and analytical thinking skills and practice values such as responsibility, cooperation, and empathy. This model encourages hands-on learning experiences, deep reflection, and concrete actions, which align with the dynamics in the Ignatian Pedagogy, such as reflection, action, and evaluation, to form competent individuals with integrity and oriented toward the common good. PBL is divided into five phases that can be observed in the following syntax scheme. [3]

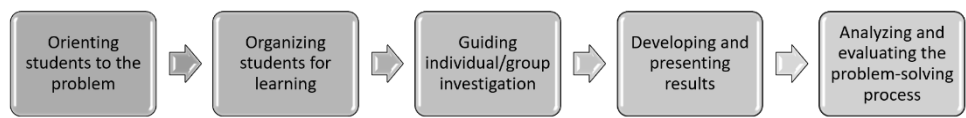


Fig. 2. PBL Syntax Schema

In their research, Putri et al. concluded that the Ignatian Pedagogical Paradigm approach helps generate feelings of pleasure, encourages learning interest, focuses students' attention, and gets students involved so that students can realize the importance and benefits of learning mathematics, which remains based on 3C (Competence-Conscience-Compassions) [4]. Some researchers in Indonesia use the term Reflective Pedagogical Paradigm (RPP) instead of Ignatian Pedagogical Paradigm. In her research, Pratini shows that applying the Reflective Pedagogical Paradigm (RPP) can develop students in terms of 3C [5]. Meanwhile, Sulistyani successfully conducted PBL based on the Reflective Pedagogy approach. The results of her research show that the phases of PBL can be implemented well in Advanced Statistics learning using RPP [6].

Grounded in the presented research, this research will be carried out to implement PBL using the Ignatian Pedagogical Paradigm approach to mathematics learning. The material taught is Annuity, where this material will not only be taught cognitively but will also understand the value of its application in real life. This research aims to determine the

implementation of PBL using the Ignatian Pedagogy cycle in mathematics learning Annuity material in vocational school students.

2 Method

This research is a qualitative study. The research subjects were 28 students of grade X of Visual Communication Design (DKV) at Bunda Mulia Vocational School, Jakarta. This study will conduct mathematical studies for the Annuity material using the PBL model by applying the Ignatian Pedagogical Paradigm. Data from this study is obtained through learning observations, learning outcomes, and student reflection outcomes. This research will describe and evaluate the implementation of learning using a PBL model based on the Ignatian Pedagogical Paradigm.

3 Results and Discussion

3.1 Description of Learning Implementation

Learning was carried out for 2 hours of lessons or 90 minutes. The material taught was Annuity, especially the definition of annuities. This material was further material from the Simple Interest and Compound Interest Chapters. This learning used the PBL learning model with a Constructivist approach. Students were guided to build their knowledge, which is the definition of Annuity. Learning objectives are formulated according to 4C.

- **Competence:** Students can understand and apply annuity concepts, including calculating annuity values, interest, and payment amounts in real situations, such as home credit or investment.
- **Conscience:** Students can recognize and differentiate actions based on Conscience in learning.
- **Compassion:** Students care about each other between group members and can help members who have difficulty understanding the material.
- **Commitment:** Students demonstrate a commitment to taking clear roles and responsibilities in completing independent or group tasks.

3.1.1 Context Excavation

Learning began with excavating the student context. The teacher displayed a motorbike credit brochure, often found or given on the street (Figure 3). The teacher asked how to read the information and asked several students for an opinion. Some students could express their opinions and understand how to read and interpret information in a brochure.

TIPE MOTOR	UANG MUKA	ANGSURAN PER BULAN / ARREAR			
		11	23	35	47
PCX 160 CBS 34,560,000.00	3,500,000	3,549,000	1,969,000	1,492,000	1,270,000
	4,000,000	3,496,000	1,940,000	1,470,000	1,251,000
	4,500,000	3,443,000	1,911,000	1,448,000	1,233,000
PCX 160 ABS 37,810,000.00	3,800,000	3,864,000	2,144,000	1,624,000	1,382,000
	4,000,000	3,843,000	2,133,000	1,616,000	1,375,000
	4,500,000	3,790,000	2,103,000	1,594,000	1,356,000
ADV 160 CBS 36,810,000.00	3,700,000	3,768,000	2,091,000	1,584,000	1,348,000
	4,000,000	3,736,000	2,073,000	1,571,000	1,337,000
	4,500,000	3,683,000	2,044,000	1,549,000	1,318,000
ADV 160 ABS 39,650,000.00	4,000,000	4,039,000	2,242,000	1,698,000	1,445,000
	4,500,000	3,986,000	2,212,000	1,676,000	1,426,000
	5,000,000	3,933,000	2,183,000	1,654,000	1,408,000
CB150 Verza SW 23,270,000.00	2,400,000	2,437,000	1,354,000	1,024,000	870,000
	2,500,000	2,427,000	1,348,000	1,019,000	867,000
	2,750,000	2,400,000	1,333,000	1,009,000	857,000
CB150 Verza CW 23,930,000.00	2,400,000	2,508,000	1,393,000	1,053,000	895,000
	2,500,000	2,497,000	1,387,000	1,049,000	892,000
	2,750,000	2,471,000	1,372,000	1,038,000	882,000
SONIC 150R 26,740,000.00	2,700,000	2,775,000	1,541,000	1,165,000	990,000
	2,750,000	2,770,000	1,538,000	1,163,000	988,000
	3,000,000	2,743,000	1,523,000	1,152,000	979,000
SONIC 150R HRR 27,150,000.00	2,800,000	2,808,000	1,559,000	1,179,000	1,002,000
	3,000,000	2,786,000	1,547,000	1,170,000	995,000
	3,250,000	2,760,000	1,533,000	1,159,000	985,000
CB150R Streetfire Std 31,810,000.00	3,200,000	3,261,000	1,810,000	1,369,000	1,163,000
	3,250,000	3,256,000	1,807,000	1,367,000	1,162,000
	3,500,000	3,229,000	1,793,000	1,356,000	1,152,000
CB150R Streetfire SE 32,820,000.00	3,300,000	3,358,000	1,864,000	1,410,000	1,198,000
	3,500,000	3,337,000	1,852,000	1,401,000	1,190,000
	3,750,000	3,310,000	1,838,000	1,390,000	1,181,000
CRF150L 37,670,000.00	3,800,000	3,849,000	2,136,000	1,618,000	1,366,000
	4,000,000	3,828,000	2,124,000	1,609,000	1,359,000
	4,250,000	3,801,000	2,110,000	1,598,000	1,350,000

Fig. 3. Example of Motorbike Credit Brochure

From the picture provided, the teacher asked students' opinions regarding credit, such as what objects are usually purchased with credit and students' responses regarding credit payments. Most students thought valuable objects like cellphones, motorbikes, cars, houses, etc., were usually purchased with credit. There was also a student who believed that all goods today could be purchased on credit; in simple terms, the student explained the existence of a Paylater method on several shopping platforms, which states that any item can be purchased on credit. Furthermore, some students also argued that credit methods cost money more than cash purchases; they felt that credit methods are quite disadvantageous to them. Through this process, teachers found the student context that students already understood the concept of credit, and purchasing goods using the credit method was also common for them to use or encounter in everyday life.

At the beginning of the lesson, the teacher also asked how students bought an item with their own money. Some said that they saved by setting aside pocket money. Some bought goods if they got more money; for example, during Chinese New Year, they got red envelopes. Through this process, teachers could find the context in which students aged 15-16 are able to manage pocket money.

3.1.2 Experience

In the first PBL phase, orienting students to the problems, teachers asked how to determine the money that needs to be deposited monthly (in installments) when students buy goods on credit. In the second phase, organizing students for learning, teachers divided students into groups of three students and distributed Student Worksheets to solve problems. The Student Worksheet gave them experience finding definitions of annuities. Student Worksheets were deliberately designed to guide students in constructing their knowledge and finding

definitions of annuities. Through working on the Student Worksheet in this group, students built an active and enjoyable learning experience.

3.1.3 Reflection

At the beginning of learning, when excavating context, students also reflected on how they managed their finances. Students reflected on whether they have been able to manage the money they have well. They also reflected on how to buy the items they wanted with their money.

In the group discussion, students reflected on how they solved problems with the Student Worksheet using the information provided and their knowledge. In addition, they could reflect on how much they contributed to the group's success in answering questions. At the end of learning, students were given a small paper to write their reflections on. The reflections consisted of several questions regarding their learning experience in this material. The reflection questions are also integrated with the 4C Principles, as in Table 1. The results of the reflections are shown in Table 2.

Table 1. Reflection Question Guide

4C Principles	Reflection Questions
Competence	- What did you learn today? - Do you understand today's lesson? If not, which part do you not understand?
Conscience	- Why is it important to understand the concept of interest rates and annuities when making credit-related decisions?
Compassion	- How did you contribute to the group discussion? - Describe your feelings today in one sentence!
Commitment	- In your opinion, what was the most interesting thing from today's lesson?

Table 2. Summary of Reflection Results

Competence	Conscience	Compassion	Commitment
All students understood what was learned today. Some felt confident, while some still struggled with the calculations.	Some students understood the importance of learning about credit and annuities, particularly to prepare for the future and make wiser credit decisions.	Some students contributed during group discussions, some helped with calculations, while others assisted their peers. However, some students felt they did not contribute much. Some students were happy with today's lesson, while others felt tired from a full day of activities.	Most students found the lesson interesting because they learned about the calculations involved when taking credit.

3.1.4 Action

After group discussion, teachers selected several student group representatives to present the discussion results and their results in answering problems. In PBL syntax, this is the phase of developing and presenting results. Several group representatives presented their answers in front of the class. Through this presentation, students explained the concepts excavated, namely the definition of annuities in communication skills. They shared an understanding that can then be the subject of class discussions.

When making a presentation, students were not only required to understand the material (competence) but also considered how to convey it clearly and care about their friends' understanding (compassion). This demands real action in communicating effectively. In addition, this condition resembles a real-world situation where one must present an idea or solution to another person. It trains students to take actions relevant to their professional lives. The following image is documentation of students presenting in front of the class.



Fig 4. Students Taking Action

3.1.5 Assessment

Evaluation or assessment in this Ignatian Pedagogy is carried out based on 4C. Competence assessment in learning at this meeting was carried out by assessing Student Worksheet performance. Each group's Student Worksheet results were based on preciseness and completeness. Meanwhile, Conscience, Compassion, and Commitment assessments were carried out by observing students' learning experiences and contributions to group discussions. Each aspect comprises six indicators with value provisions: Score 4 for 5-6 indicators is met, score 3 for 3-4 indicators is met, score 2 for 1-2 indicators is met, and score 1 if no indicator is met.

Table 3. Summary of Evaluation Results

Competence	Conscience	Compassion	Commitment
All groups have completed the Student Worksheet. Most answers are correct, but the calculations still have some errors.	Most students were able to recognize actions based on Conscience during group dynamics. They demonstrated honesty, respect, fairness,	Some students were able to show care among group members and help friends who had difficulty understanding the	Most students showed Commitment by taking roles and responsibilities in completing tasks. All students were willing to work on the tasks,

	professionalism, and responsibility.	material. During the process, some students voluntarily helped without looking down on their friends' abilities and backgrounds.	but some still lacked initiative in asking about material they did not understand.
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3.2 Ignatian Pedagogical Spirit in the Learning Experience

The Ignatian Pedagogy Paradigm aims to help students develop into individuals who are devoted to God [1]. The goal of life in this learning process is to become a complete human being. Being complete means developing one's personality and becoming an advanced human being willing to live and collaborate with others. The principles or spirit that accompany this goal include Personalist Cura and Lifelong Learning.

3.2.1 Cura Personalis

Cura personalis, which means care for the whole person, focuses on creating meaningful and personalized learning experiences. *Cura personalis* means reviewing daily life [7]. By linking annuities to real situations, such as home credit simulations or Paylater, students felt that learning directly impacts their lives. Meanwhile, through reflection questions such as "What was the most interesting thing from today's lesson?" students were invited to see the impact of learning on their personal development.

In the discussion and presentation process, students were encouraged to try and not be afraid of failure. Learning is a growing process that builds self-confidence so students feel their potential is recognized. Teachers provide opportunities for exploration so students can take initiative in learning.

3.2.2 Lifelong Learning

Lifelong education is a concept that can be carried out anytime, anywhere, and without age restrictions. Kenneth H. Silber [8] argues that everyone is a learner throughout their life. Learning related to annuities certainly does not only limit mathematical concepts but also connects them with real applications such as credit and savings planning. Students learned that this knowledge can be applied to financial management decision-making, a skill they will need in the future.

In a reflection, a student wrote, "Knowledge of this material can help me in the future." Through this writing, the student saw learning as fulfilling academic obligations and investing in developing valuable abilities at various stages of life. This belief builds a lifelong learning mindset, in which learning is seen as a means of growing fully throughout life.

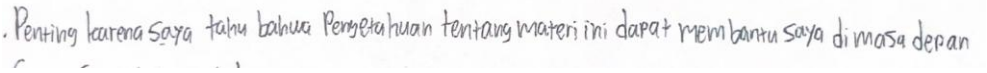


Fig 5. A Student's Reflection

4 Conclusion

The results of this study lead to the conclusion that the Ignatian Pedagogy Paradigm applied through the Problem-Based Learning (PBL) model has successfully created a meaningful learning experience for students learning Annuity materials. This learning process builds

students' cognitive abilities, such as understanding and applying annuity concepts. It integrates the values of conscience, care, and commitment in line with the 4C (Competence, Conscience, Compassion, and Commitment) principles. The context of this lesson relates this material to the actual situation by reading the information in the credit brochure. Then, through the discussion process and working on the Student Worksheet, students can build an active and enjoyable learning experience. Processes of deep reflection and practical action, such as group discussion, help build students' social skills and self-confidence, allowing them to develop academically and personally.

This learning instills the spirit of lifelong learning by motivating students to view learning as a continuous process. By linking Annuity materials with practical applications such as financial management, students learn that the knowledge they acquire has long-term benefits in their personal and professional lives. This approach aligns with the spirit of *Cura personalis*, which emphasizes attention to each student's needs, potential, and individual experiences. Therefore, applying the Ignatian Pedagogy Paradigm through PBL helps students understand academic material and builds a person who is reflective, responsible, and ready to face future challenges.

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