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RESEARCH BASED ON DESIGN: ELABORATION OF EXPERIMENTAL DIDACTIC SEQUENCE

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Objective:

- ✓ To create an experimental didactic sequence using materials of low cost and easy access.
- ✓ To evaluate its applicability in the classroom.

Theoretical Basis

Design-based research is a interventionist methodology that seeks to combine theoretical aspects of educational research with practice.

In research in science education, **Design-Based Research (DBR)** has been used to plan, implement, and evaluate didactic sequences.

THEORETICAL BASICS

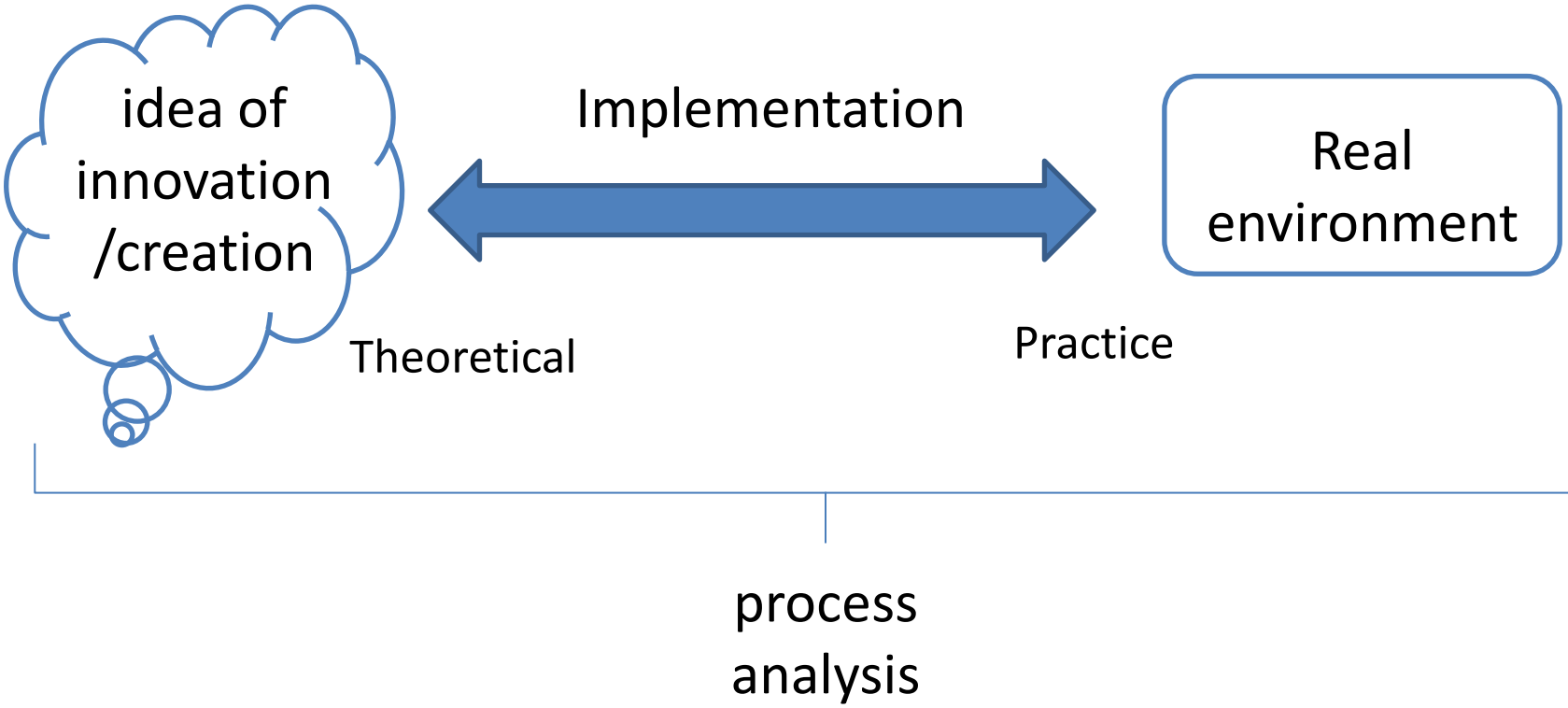

Figure 1: DBR Methodology (KNEUBIL, PIETRECOLA ,2017)

Methodology

This study is based on Design-Based Research, which combines aspects of educational research with practice in real environments [5].

The team was formed by

- a researcher in the field of chemistry teaching,
- a teacher of basic education and
- two students of the licentiate degree course in chemistry.

The process of developing TLS (Teaching-Learning-Sequences) involves, 5 steps:

1. **Selection of theme / proposition of design principles**
2. **Design**
3. **Implementation**
4. **Evaluation**
5. **Re-design**

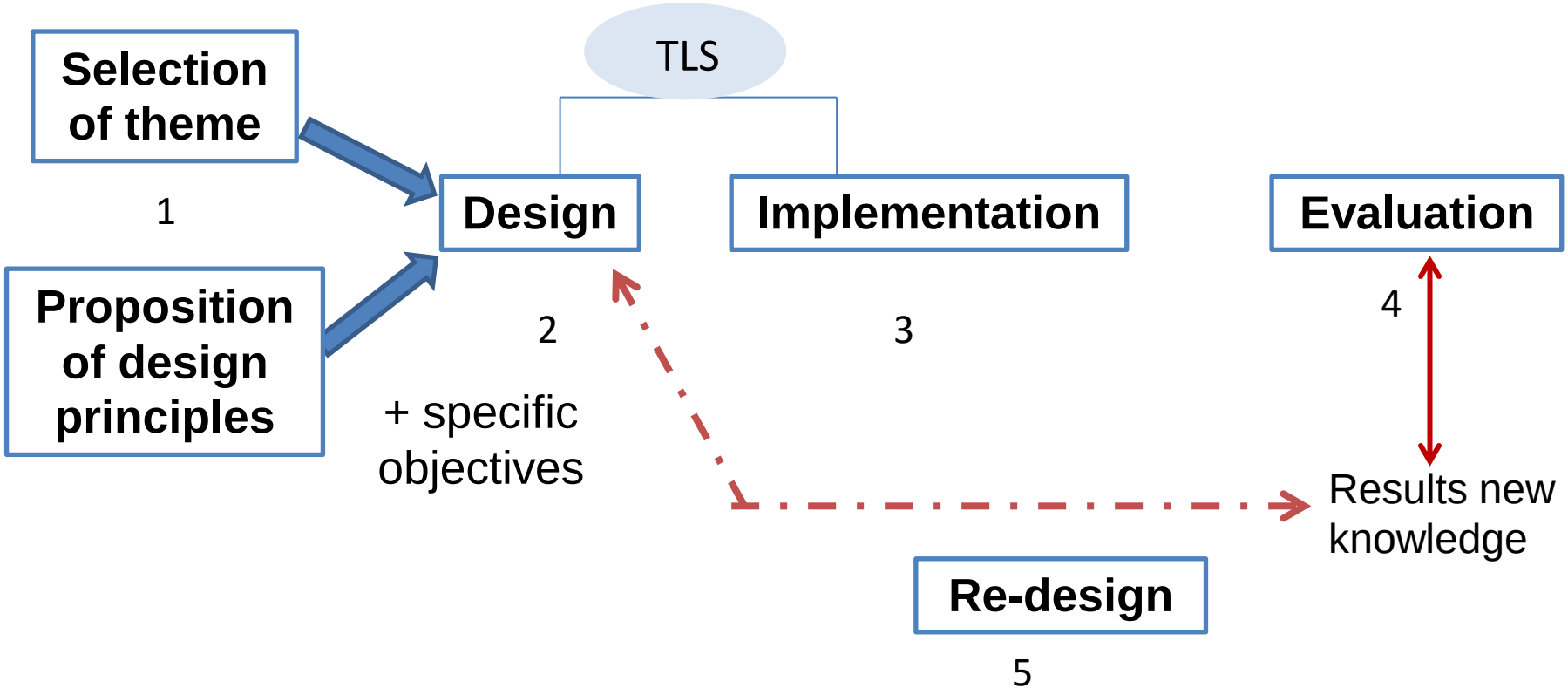

Figure 2: Stages of the design process (KNEUBIL, PIETRECOLA ,2017, 10)

Results

First class

An introduction was made on mixtures, solutions, types of mixture (homogeneous and heterogeneous), solute, solvent, number of phases and concentrations.

Figure 3. Examples of homogeneous and heterogeneous mixtures in daily life

Second class

In this class, the students prepared the pulp from the fruit (Figure 4) and from that pulp they should prepare a concentrated juice and another diluted juice.

Figure 4: Acerola

First glass

added 1 spoon of powdered juice and 200 mL water

Second glass

added 4 spoons of powdered juice and 200 mL water

Third glass

added 1 spoon of powdered juice and 100 mL water

Through these data, the students described in which glasses the juice were most concentrated and in which ones, more diluted.

Third class

The students identified the additives present in the label.

Acerola

Composição:

Açúcar, maltodextrina, polpa de acerola desidratada, ferro, vitamina C, vitamina A, acidulante ácido cítrico, antiumectante fosfato tricálcico, espessantes: Goma Xantana e Carboximetilcelulose, regulador de acidez citrato de sódio, aroma idêntico ao natural, edulcorantes artificiais: Aspartame (27mg/100ml), Ciclamato de Sódio (18mg/100ml), Acessulfame de Potássio (3,5mg/100ml) e Sacarina Sódica (1,5mg/100ml), corante inorgânico dióxido de titânio e corantes artificiais: Bordeaux S e tartrazina.

Não Contém Glúten, Fenilcentonúricos: Contém Fenilalanina - Não Fermentado - Não Alcoólico.

Third class

The class was divided into three groups, each received a scientific text on food additives [7], [8], [9].

Each group read and discussed of the text and presented to the other groups what they understood about the topic.

The analysis of the process and on the implementation revealed that:

- ✓ It is necessary to relate the contents of chemical content to the experimental part.
- ✓ the use of low cost and easy everyday materials allows the development of experimental activities.
- ✓ The reading of the labels allowed the study of food additives.

Final considerations

- ✓ The students feel more curious about the experiments,
- ✓ It was noticed the need to work more experimental classes in the school.
- ✓ We suggest that to increase the frequency of experimental classes, teachers can use alternative materials.
- ✓ For the next re-design, more exercises on solutions and concentration will be incorporated.

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Thanks for listening

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