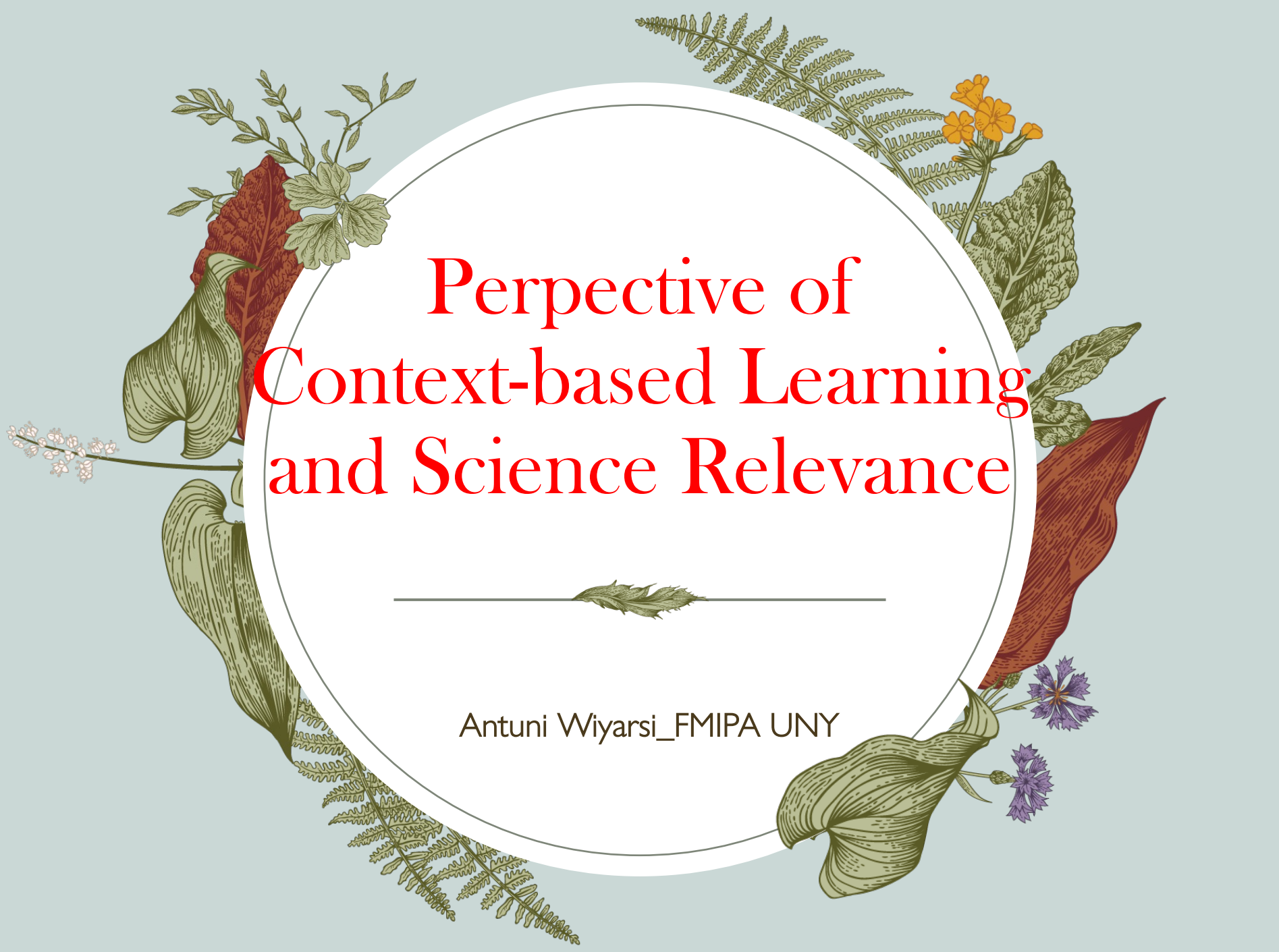


A circular wreath of various botanical illustrations, including green ferns, red and orange flowers, and large green leaves, framing a central white circle.

Perspective of Context-based Learning and Science Relevance

Antuni Wiyarsi_FMIPA UNY



Overviews

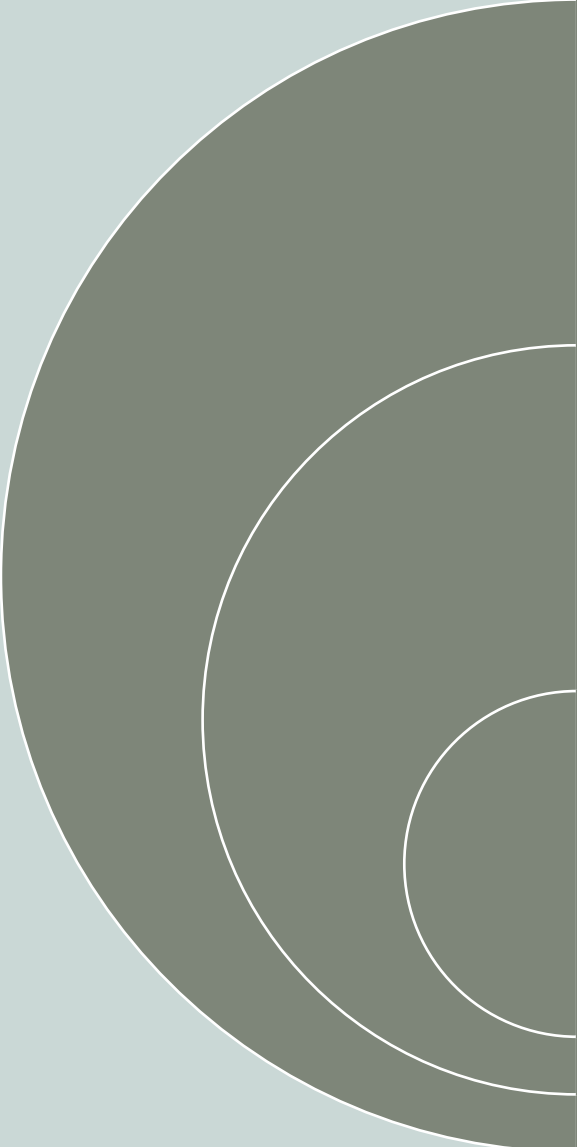
Why is CBL

What are CBL

How the change of relevance
concept

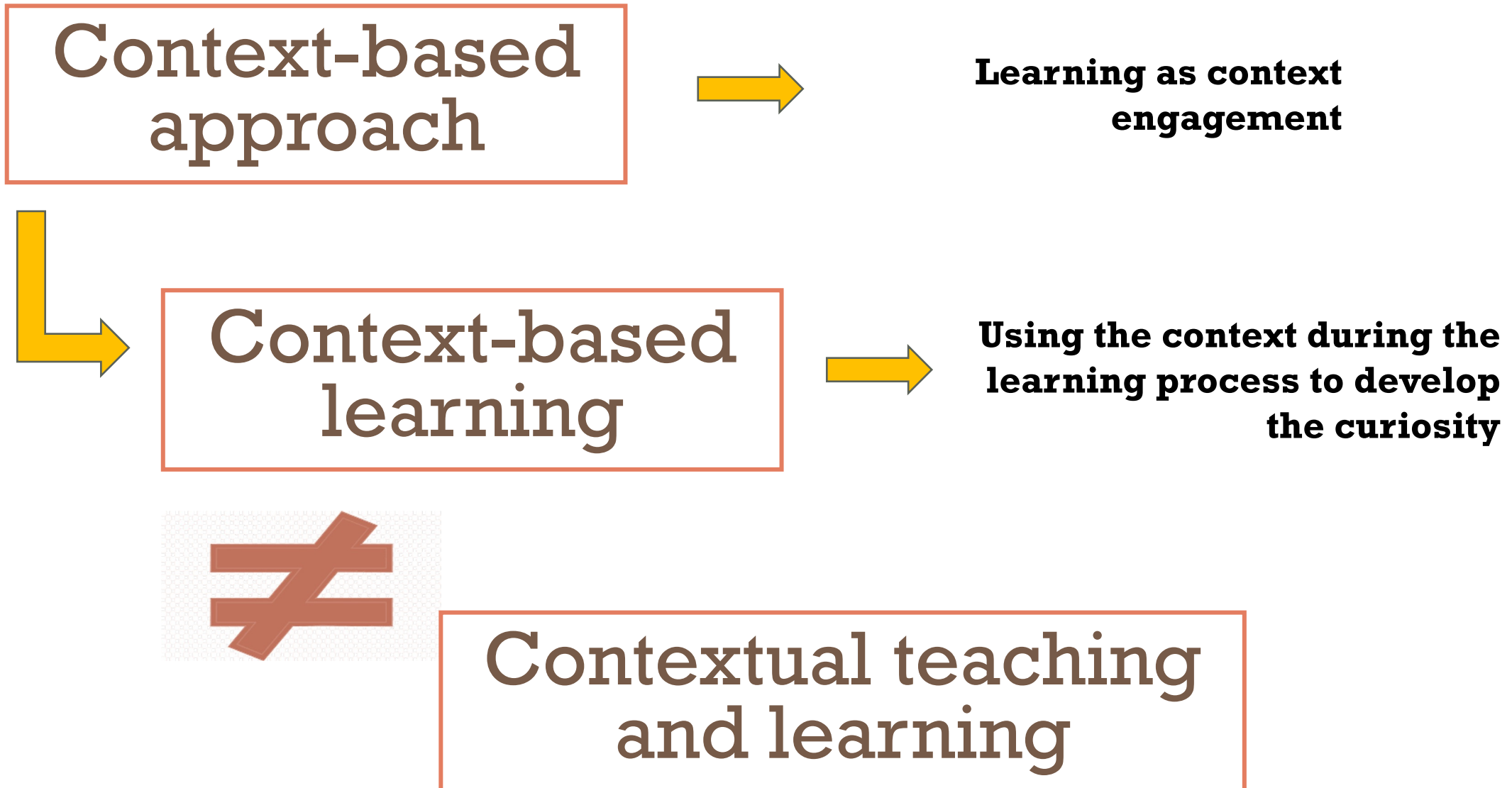
What is science relevance

WHY Context-based Chemistry Learning (CbCL)?



5-interrelated problems in chemistry education	• Isolated fact • Overload • Lack of transfer • Lack of relevance • Inadequate emphasize
Science education goals	• Scientific literacy • Science for all • Responsible citizen
Nature of Science (NOS)	• Science as culture activity • Science as value • Science as scientific activity • Science as knowledge • Worldview

WHAT is CbCL?



A SUMMARY OF THE CONTEXT-BASED PROGRAMS IN SEVERAL COUNTRIES (Ultay & Calik, 2012)

Context-based approach	Country	Age/level	Description
Salters Advanced Chemistry (SAC)	UK	17–18 year olds	SAC emphasizes industrial and real-life applications of chemistry
Chemistry in Context	USA	18–20 year olds	It focuses on a meaningful connection between students' learning of chemistry, and their daily life and societal issues
ChemCom	USA	Upper secondary	ChemCom integrates community issues to chemistry
Industrial Chemistry	Israel	12th grade	Industrial Chemistry provides with the opportunity to describe the contexts of real situations and actual problems that exist in the chemical industry
Chemie im Kontext (ChiK)	Germany	10th and 11th grades	ChiK aims at the improvement of chemistry teaching at secondary school in Germany
Chemistry in Practice (ChiP)	The Netherlands	Secondary	Aims at creating meaningful connection between chemistry and daily life and societal issues

What is the meaning of 'relevance' in science/chemistry education?



The late 1950s and early 1960s

- ☐ Science education should present learners with a real picture of science, including theories and models;
- ☐ Science education should present an authentic picture of scientists and their method of research;
- ☐ Science education should present the nature of science (NOS);
- ☐ Science education should be structured and developed using the discipline approach (key concepts in each of the subjects).

The late 1960s and 1970s

Hurd, 1970

- ❑ Science knowledge was to be used to answer important questions that people encountered in their everyday lives, not just to provide answers about theoretical sciences. (p. 378)
- ❑ This movement emphasised the relevance of learning science for the vast majority of students who would never embark on future careers in either science or engineering.
- ❑ The focus shifted towards helping all pupils cope with their life worlds through an understanding of the role that science and technology plays, both in their personal lives and in society

The 1980s

Harms and Yager (1981), That science education should:

- ☐ Emphasise science as a path to a future career;
- ☐ Include major concerns regarding science as a means for resolving current societal problems;
- ☐ Provide a means to attend to the personal needs of students; and
- ☐ Provide greater awareness of potential careers in science, technology, and related fields, including suggesting goals which are more important than those traditionally used to academically prepare for future science courses.

Hofstein & Yager (1982)

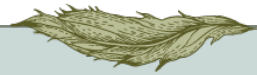
The relevance of science should be emphasised through greater consideration of the application of scientific principles to everyday life, technology, the production of food, and the conservation of the environment

Science, Technology, and Society (STS) Approach

From the 1990s to date

- ❑ Relevance used as a synonym for student interest (Childs, 2006; Ramsden, 1998; ROSE, 2004)
- ❑ Relevance used as students' perception of meaningfulness for understanding contexts connected to their lives (Gilbert, 2006; King, 2012; Lyons, 2006; Mandler, Mamlok-Naaman, Blonder, Yayan, & Hofstein, 2012).
- ❑ Relevance connected to student needs, which is used as a synonym for importance, usefulness or needs-matching (Keller, 1983; Simon & Amos, 2011).
- ❑ Relevance viewed in the sense of real-life effects for individuals and society, e.g. in terms of growing prosperity and sustainable development by the application of science and technology to societal, economic, environmental, and political issues (De Haan, 2006; Hofstein & Kesner, 2006; Knamiller, 1984)
- ❑ Relevance viewed multi-dimensionally and applied as a combination of selected elements borrowed from categories I–IV (Aikenhead, 2003; Kahl & Harms, 1981; Newton, 1988a, 1988b; Rannikmäe, Teppo, & Holbrook, 2010).

What is the meaning of 'relevance' in chemistry education? (conclusion)



late 1960s and 1970s

a real picture of chemistry, including theories and models

understanding of the role of chemistry in students' daily activities

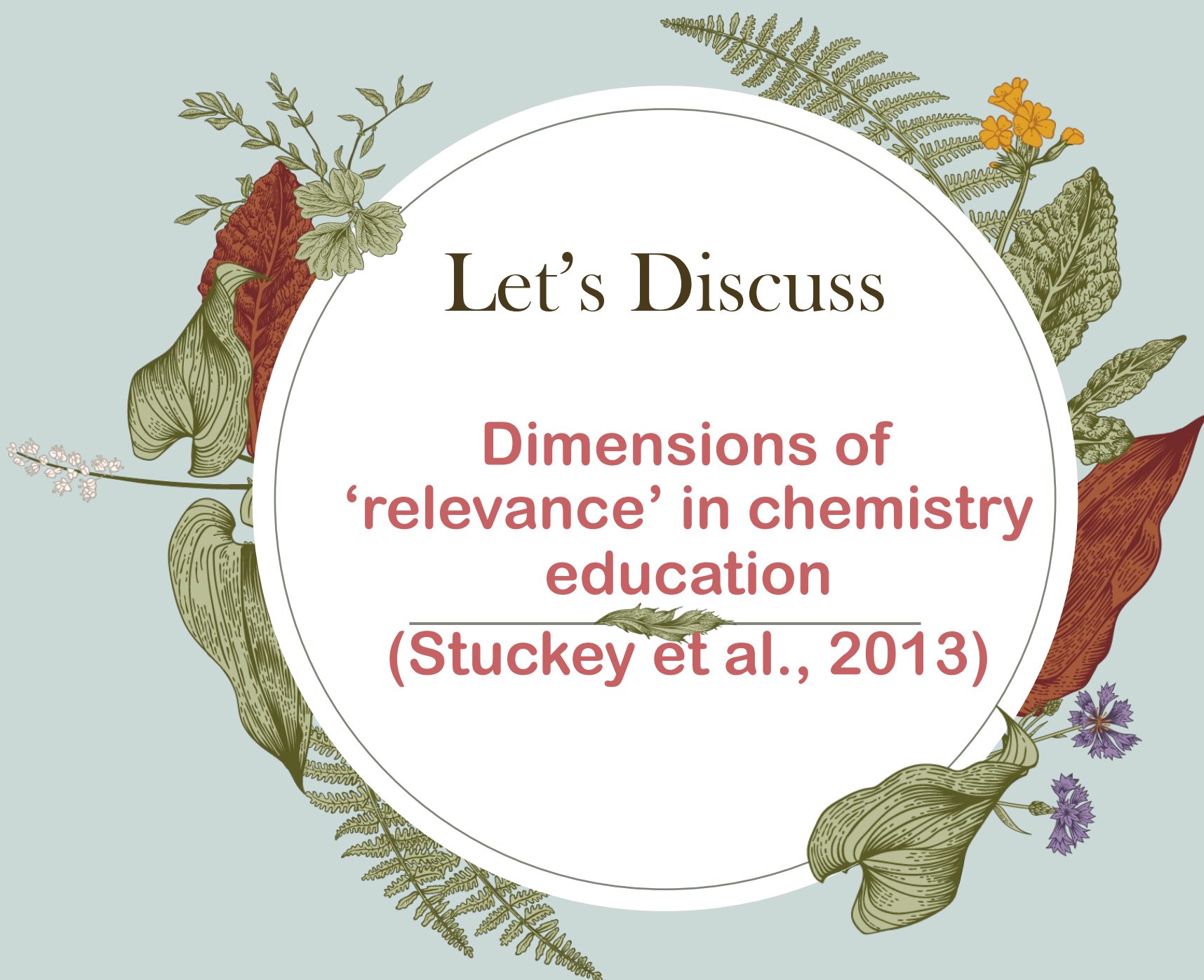
resolving current societal and technological problems; personal needs of students,

From the 1990s to date

Multidimensional:
perception of meaningfulness, sense of real-life effects for individuals and society

1950s and early 1960s

1980s

A circular wreath of various botanical illustrations surrounds the central text. The wreath includes green ferns, a red maple leaf, a green leaf with a prominent vein, a cluster of small pink flowers, a large green leaf, a red leaf, and several purple flowers.

Let's Discuss

Dimensions of
'relevance' in chemistry
education

(Stuckey et al., 2013)

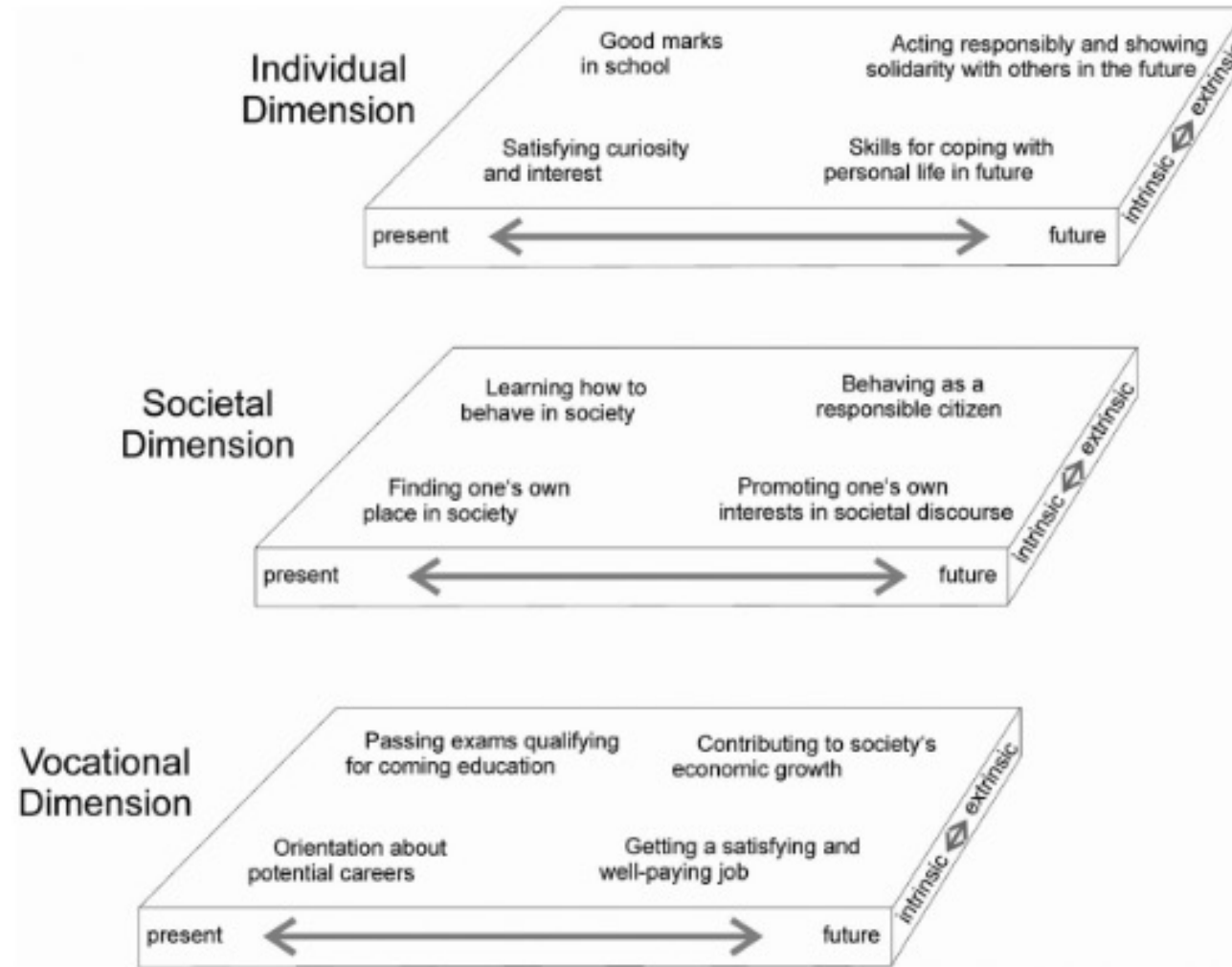


Fig. 1 An illustration of a suggested model for the relevance of science education with its individual, societal and vocational dimensions, including examples illustrating the present–future and intrinsic–extrinsic ranges involved (Stuckey *et al.*, 2013).

Dimensions of 'relevance' in chemistry education (Stuckey et al., 2013)



Three dimensions (individual, societal and vocational) and
Four components (present, future, intrinsic and extrinsic)

- ❑ **The individual dimension:** the relevance of science education for the individual encompasses matching the learners' curiosity and interests, providing students with necessary and useful skills for coping with their everyday lives today and in the future, and contributing to the development of intellectual skills.
- ❑ **The societal dimension:** the relevance of science education from the societal viewpoint focuses on preparation of pupils for self-determination and a responsibly led life in society by understanding the interdependence and interaction of science and society, developing skills for societal participation and competencies for contributing to society's sustainable development.
- ❑ **The vocational dimension:** the relevance of science education in the vocational dimension is composed of offering orientation for future professions and careers, preparation for further academic or vocational training and opening up formal career chances



Individual dimension

e.g., Healthy, religious



Societal dimension

e.g., Acceptance in the community, environmental issue



Vocational dimension

e.g., Looking for job, future education



“

Let's think another example

”





Thank you

