TEACHING VALUES IN TECHNOLOGY EDUCATION THROUGH CO-DESIGN

NESHANE HARVEY AND PIET ANKIEWICZ

UNIVERSITY OF JOHANNESBURG

PATT 40, LIVERPOOL, UK

1. INTRODUCTION

- *The exploration of the context for designing and making stage* – value judgements (Martin, 2002)
- Transform pedagogy – values are co-constructed rather than inflicted (Dakers, 2005)
- Co-design pedagogy is offered as a counteractive means
- Co-design – one approach to human-centered design (HCD)
- Co-design pedagogy – aligns with socially constructed values (Dakers, 2005)
- The paper discusses three (pedagogical) co-design principles
- Replacing the current orthodox pedagogy by ones in which values relating to technology and technology education are co-constructed requires investigation

INTRODUCTION – CONT.

- **Conceptual paper serves a two-fold aim**:
  1. Draws on the findings of three (pedagogical) design principles emanating from co-design interventions in fashion design education:
     i. users as core and inspirational source,
     ii. design with users, and
     iii. identify user needs for integration
  2. Draws linkages to technology education and proposes strategies for teaching moral values

- **Research question**:

How can co-design principles be linked to and inform strategies for teaching moral values in technology education?

2. DESIGN PRINCIPLES FOR CO-DESIGN INTERVENTIONS

2.1 Research methodology

- Qualitative design-based research
- Doctoral project – scholarship on HCD to establish design principles of co-design
- Three distilled (pedagogical) design principles are considered for this paper:
  1. users as a core and inspirational source (DP1)
  2. design with users (DP2)
  3. identify user needs for integration with design (DP3)
- Design principles – design two teaching and learning interventions
- Pedagogical strategies – role-play
  1. engage in qualitative discussions to establish the context of design use, user needs, preferences, goals, and design requirements, and
  2. in collaboration, co-design, and develop a product with the user

Research methodology – Cont.

- Purposive sampling – three groups: 24 (pilot); 23 (main) students, two educators, and a researcher
- Principal author (researcher) – primary observer
- Students – self-administered hard-copy questionnaires
- Educators – individual face-to-face, semi-structured interviews
- Data analysis – constant comparative method – Atlas.ti
- Second purpose – empirical finding of the three design principles was superimposed on a conceptual meta-synthesis of the teaching of moral values in TE to draw linkages to technology education and proposes strategies for teaching moral values

2.2 Empirical findings

Detailed descriptions of the design principles available in a previous publication (Harvey & Ankiewicz, 2022)

2.2.1 Users as core and inspirational source (DP1)

- Unexpected way of thinking about and practicing design through understanding, consideration, and value judgements of design with empathy
- Hero-designer values metamorphosed – more considerate of the user and user value judgements to drive design

2.2.2 Design with users (DP2)

- User values, voice, and participation in the design process changed students' perceptions on the user's role in the design process and benefits of involving them
- Preferred – better aligns design practice with user needs and values than the hero-designer approach
- New insight about design through negotiated value judgments, agreement in decision-making, inclusivity and collaboration

Empirical findings – Cont.

2.2.3 Identify user needs for integration with design (DP3)

- Designers engaged in primary research and engaged users in qualitative discussions to collect information about user needs, goals, preferences, and context of design usage
- Primary research – identify design criteria without personal value judgements
- Influenced social values of rapport building, relationship development, and harmony in a non-judgmental manner
- It encouraged critical analysis and reasoning regarding social importance
- Educators could not enforce personal values because designers justified design choices based on user needs
- This led to student-directed active learning, fostering autonomous thinking, critical analysis, and rationalization rather than passive knowledge recipients.
- Active learning enabled students to integrate primary research into co-design activities, encouraging to explore ways to align design solution with user needs

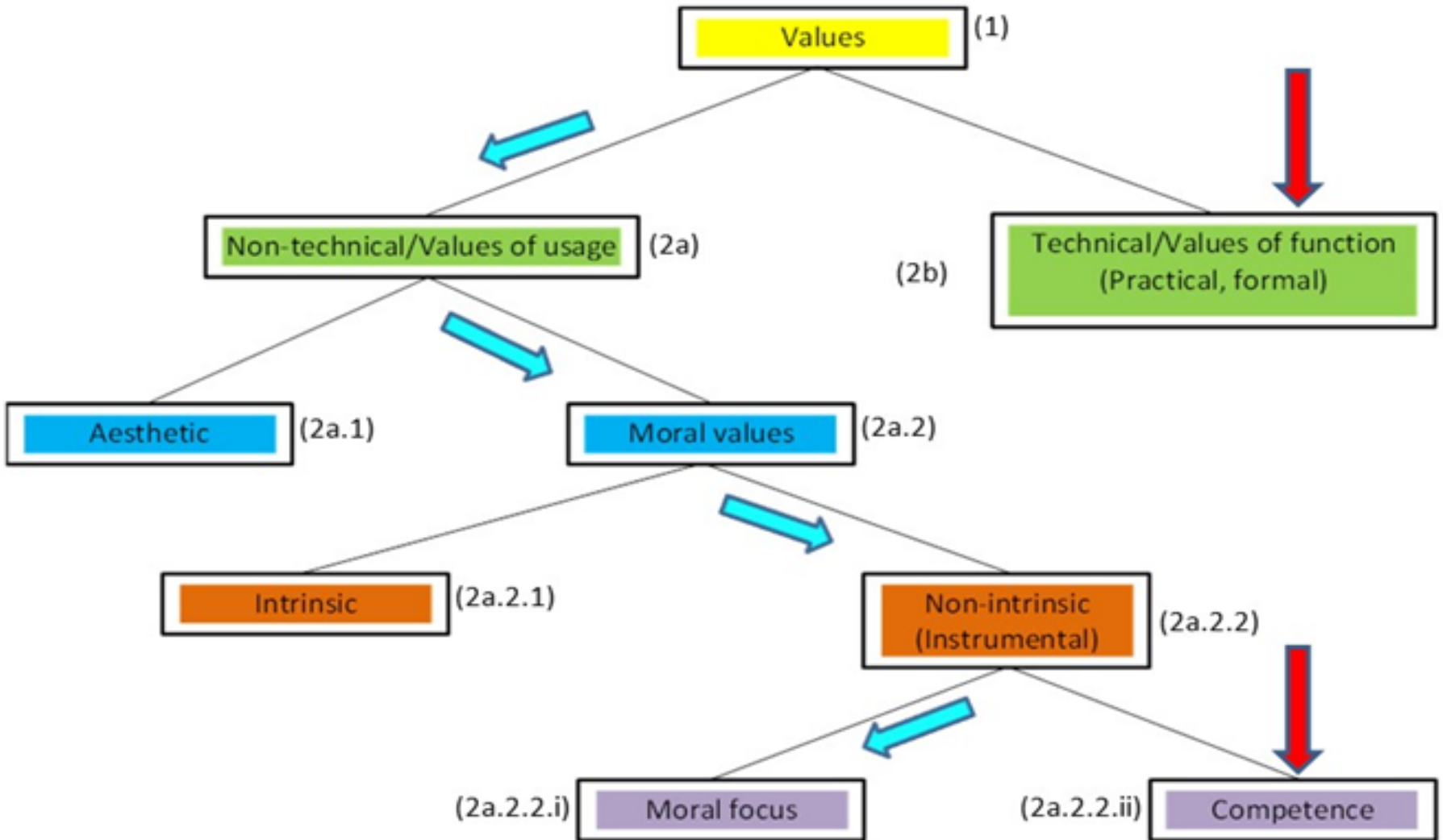
Empirical findings – Cont.

- Technology education as ‘technology informed by design’, for example, Australia, England and South Africa
- Design is a common key tenet of both technology and fashion design
- The intervention in fashion design education was based on the philosophy of technology and TE by applying the technological design process in fashion design
- Although contextualised within university fashion design education, this new pedagogy may well apply to teaching values in school-context TE

3. TYPES OF VALUES IN TECHNOLOGY EDUCATION

- Literature on technology and TE – technology is value laden
- Technology exists because of human activity and is developed and used in social and environmental contexts
- It is shaped by communal beliefs, values, and attitudes of individuals, organisations, and society and, in turn, has a significant effect on shaping culture and the environment
- TE based on determinism and instrumentalism that views technology as value-neutral will reduce TE to technical education
- **Research methodology for this part** – a systematised literature review followed by a meta-synthesis of a selection of literature on the theoretical framework of values in technology and TE
- Literature reveals distinct types of values in technology and TE, for example aesthetic, economic, social, moral, environmental, political, and spiritual values
- Scholars have classified these values into broader categories. Figure 1 visually summarises the current theoretical framework of values (1) in TE

Figure 1. Types of values in technology education



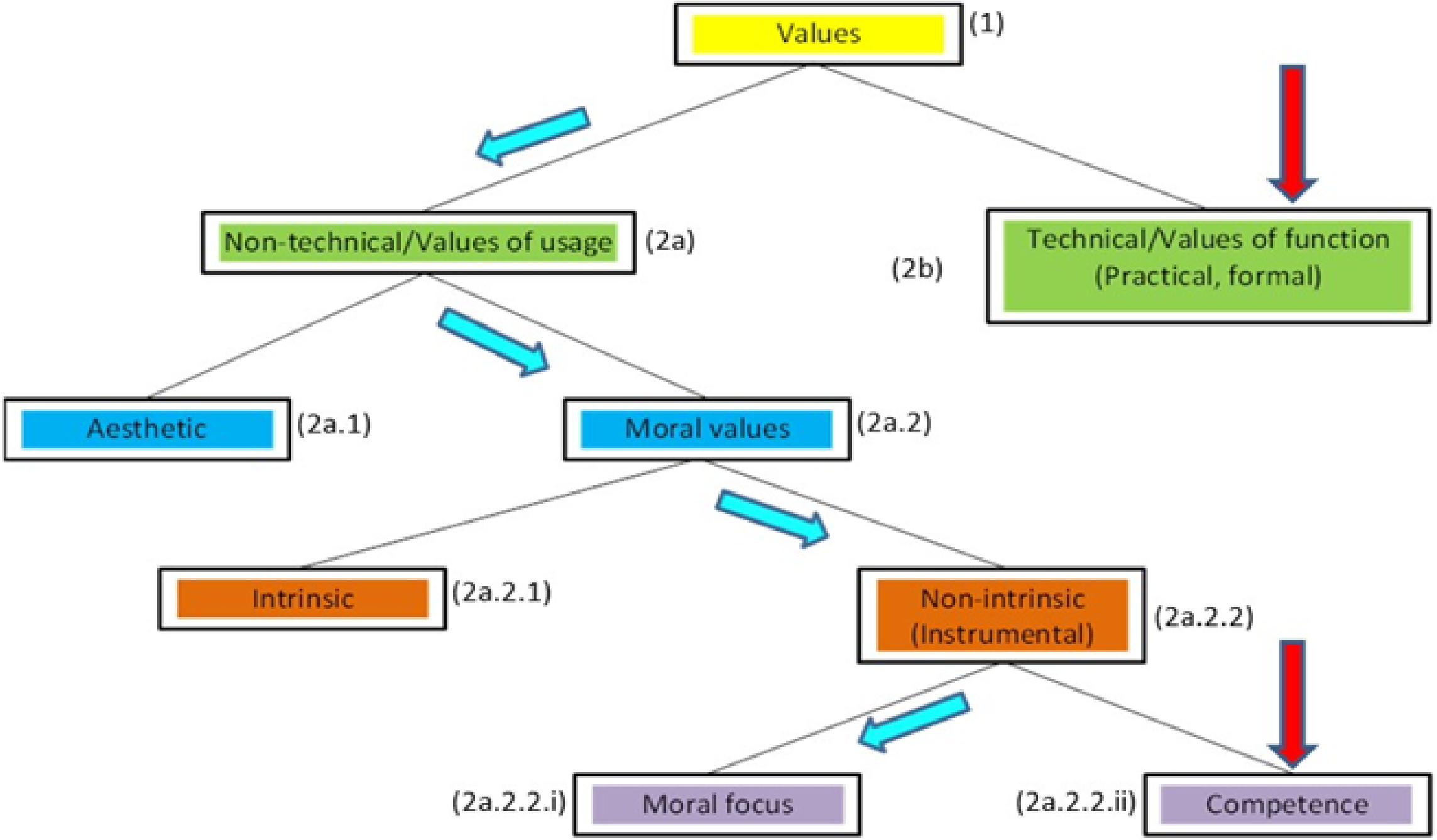

Values
(1)
Non-technical/Values of usage
(2a)
(2b)
Technical/Values of function
(Practical, formal)
Aesthetic
(2a.1)
Moral values
(2a.2)
Intrinsic
(2a.2.1)
Non-intrinsic
(Instrumental)
(2a.2.2)
(2a.2.2.i)
Moral focus
(2a.2.2.ii)
Competence

Table 1. Kinds of moral dilemmas students will face in everyday life

Moral values	Descriptions of examples	Specific examples
Honesty, responsibility and integrity	Moneymaking, substandard design solutions at the expense of quality	Preventing structural failure of buildings, bridges, towers etc.
Caring, fairness and respect	Bias towards gender, disability, cultural and religious groups in design solutions	Ensuring access for people with disabilities
Work ethic (including being punctual, responsible and reliable)	The negative impact of design solutions on individual users, communities and the environment	Managing waste, including air and noise pollution

4. FINDINGS: LINKING THE 3 CO-DESIGN PRINCIPLES TO TEACHING VALUES WITH A MORAL FOCUS

Theoretical framework of teaching values with a moral focus	Users as core and inspirational source (DP1)	Design with users (DP2)	Identify user needs for integration with design (DP3)
Most frequently proposed way of teaching values in TE is to **encourage students to think about values themselves**			X
Teachers and students need to **be explicit about the values** involved at all levels of technology and to **clarify, justify and debate their choices**			X
Teachers should **be upfront about the collective values guiding technological development** in society and in TE, as well as **the specific values** which guide both technologists and prospective technologists in schools			X
Students should have opportunities of **valuing technology independently without teachers imposing their own sets of values and norms**			X

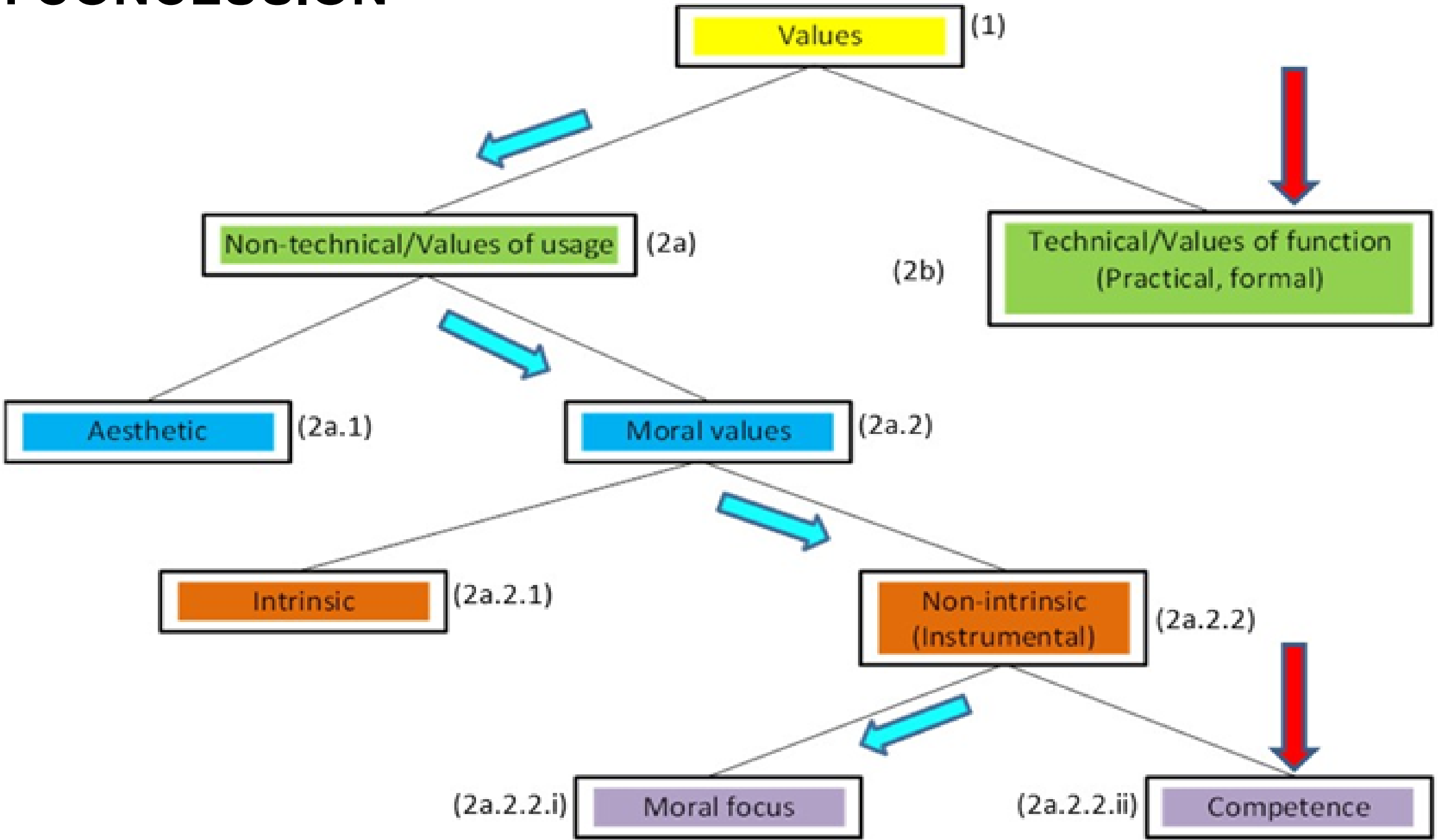
FINDINGS – CONT.

Theoretical framework of teaching values with a moral focus	Users as core and inspirational source (DP1)	Design with users (DP2)	Identify user needs for integration with design (DP3)
The **choice of the starting point of a technology project** is important to show the **connections between context, technology, and value judgments**	X		
The teacher should **choose an issue or project brief that relates to the current value system** of the students taking psychological and sociological aspects of the students' situation into consideration	X		X
Teachers may **capitalise on the pedagogies associated with STS studies**. STS studies may promote a critical approach to technology in curriculum documents by considering the relationship between society and technology. **STS teaching commences with everyday issues** instead of organizing technology lessons around concepts and processes	X		X

FINDINGS – CONT.

Theoretical framework of teaching values with a moral focus	Users as core and inspirational source (DP1)	Design with users (DP2)	Identify user needs for integration with design (DP3)
Interdisciplinary project work and integrated STS programmes may create a context in which students construct their relationship with technology and learn about its topical, motivational, and interpretative meaning		X	X
It may also require some **integration across artificial subject boundaries** of the school curriculum		X	
Teachers to **encourage critical thinking and questioning** so that students are aware that **technology is related to people, society, and the environment**			X
How students' value technology will shape their future and they are entitled to discuss such issues in the classroom	X		X

5. CONCLUSION



5. CONCLUSION – CONT.

- New pedagogy for co-design to teach moral values:

1. When introducing a project to students for the *stage of exploring the context for designing and making,* divide them in pairs of two – one assumes the role of designer and the other one the role of user.
   - ➢20 students in a class – ten users and ten designers
   - ➢larger groups students could be paired in groups of three with either one designer and two users or vice versa
2. The teacher must ensure that the curriculum, learning outcomes and activities are planned to accommodate for:
   i. users to be the core and inspirational driver (DP1)
   ii. for students to engage in primary qualitative research with users to explore their views and values for integration with design (DP3)
   iii. create opportunities for co-design activities (DP2)
   iv. place less emphasis on the functionality/efficiency and effectiveness of students' products

CONCLUSION – CONT.

3. Teachers should change their ideological beliefs, imposition of personal value-judgements and pedagogical strategies to accommodate for student engagement, co-constructed values, and collaboration

- This proposed new co-design pedagogy should be further explored at school level through action research cycles as further empirical research in future

Thank you