

## Applying the Theory of Simplicity in Home Economics Education for the Acquisition of Transversal Competencies to Face Complexity

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**Abstract.** The principal goal of Home Economics has always been that of empowering people to increase control over their lives. Home Economics education has effectively kept up with emerging needs, prioritising the competencies necessary for family and community wellbeing. Within the complex contemporary society, there is no doubt that the main concern should be to equip individuals with the tools necessary to deal with the rapid cultural and technological evolution they will face throughout life. The theory of simplicity offers a new way of perceiving and dealing with this complexity. It suggests that, based on simplifying principles, the brain finds solutions “to process complex situations very rapidly, elegantly, and efficiently, taking past experience into account and anticipating the future” (Berthoz, 2012, p.3). Thanks to its adaptive interdisciplinary nature, both as a subject and a profession, Home Economics provides the ideal setting for reflection on the simple properties and principles identified as the tools for life. Home Economists and students alike may well find that gaining awareness of these properties and acquiring the meta-cognitive ability to apply simplifying principles such as detours, inhibition, redundancy, vicariance and selective attention, can help to face the complexity in their work, studies and daily lives with a new mindset. This proposed approach suggests a consideration of curriculum reform in Home Economics education and teacher training.

**Keywords:** Curriculum Reform; Home Economics; Lifelong Learning; Simplicity; Transversal Competencies

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## Introduction

Education systems of the twenty-first century are facing numerous challenges deriving from globalization and modernization. The fast social, cultural, economic and technological change has put pressure on the education sector to ensure it provides students with the competencies required to confront and manage the complexity they are faced with effectively. Some of the salient challenges of this complex world are issues of diversity within a uniformed globalized world, an unpredictable environment in constant evolution (Fowler & van der Walt, 2004), and the obsolescence of knowledge and skills (Michel, 2001) within knowledge-based economies (Organisation for Economic Development [OECD], 1996).

What set the stage for rethinking education was therefore the acknowledgement that no amount of information, whatever its vastness, can ever be enough to prepare students for adult life and the world of work within this era of complexity. As a result, a “survival kit in terms of knowledge, competencies and values” (OECD, 1994) needed to be identified, with the suggested areas to be covered being “orientation in the political, social, and economic world, problem solving capacity in everyday and critical key situations, communication skills, degree of autonomy (measured through self perception), and ... perception of critical human values (e.g., prejudice versus tolerance, solidarity, etc).” (Salganik, Rychen, Moser & Konstant, 1999 pp. 13-14). This, in turn, set forth the focus towards finding suitable didactic and assessment strategies to ascertain the acquisition of transversal competencies within a lifelong learning perspective.

Throughout its history, the mission of Home Economics education has always been that of empowering people to increase control over their lives by passing on the knowledge and skills considered fundamental for a healthy and productive life. All over the world different names are attributed to it, such as family and consumer studies, home science and domestic economy and is offered as a compulsory or elective subject from as early as the first years in nursery school up to post-graduate courses. However, there are still countries such as Italy, where Home Economics is not offered and although there have been some initiatives, they are short sporadic projects and their implementation is at the discretion of school directors.

What gives this subject its avant-garde characteristic is that it has always drawn from multiple disciplines, “synthesising these through interdisciplinary and transdisciplinary inquiry” (IFHE, 2008). As further stated in the IFHE position statement (2008) “this coalescing of disciplinary knowledge is essential because the phenomena and challenges of everyday life are not typically one-dimensional.” Owing to the endorsement of this complex ecological model, the Home Economics field of study has been able to evolve, prioritising and meeting the economic and socio-cultural needs of the time and the contexts it is taught in.

In fact, as Smith and de Zwart (2010, p. 21) outline, the subject:

helps young people to optimize living in their current familial and personal relationships and to plan well for their future relationships and families. It aspires to increase the resourcefulness of people and help them to live satisfying, sustainable and quality lives caring for themselves and others. Home economics provides young people with the opportunity to consider problems beforehand, contributing to development of self-reliant attitudes and abilities and a sense of social responsibility.

The Home Economics mission, pedagogy and curriculum content provide the ideal setting to reflect on how complex adaptive systems, whether a single cell, the human brain or society, make use of simplex properties and principles “to process complex situations very rapidly, elegantly, and efficiently, taking past experience into account and anticipating the future” (Berthoz, 2012, p. 3). Indeed, as acknowledged in recent literature on responsible living (Thoresen, Didham, Klein & Doyle, 2015), Home Economics education needs to embrace systems thinking as a key approach with the aim of developing “an ethics of the whole and modes of being in the world based on interdependence, relatedness and connectivity” (Turkki, 2015, p. 152). Gaining awareness of and acquiring the meta-cognitive abilities to apply these simplifying solutions can offer teachers and students an alternative way to face the multi-dimensional scenarios in their work, studies and daily lives with a new mindset (Aiello, 2012).

Before delving further into the argument, a clarification on the definition of competency needs to be made. It is widely acknowledged that terms such as competencies, know-how, skills, abilities, capacities, capabilities and aptitudes are often associated with different meanings depending on the context (Gordon et al., 2009). After a non-exhaustive review of the literature, the one which was deemed to be most comprehensive and which embraces all aspects of the term, especially when looking into transversal competencies, is Pelleray’s definition of a competency as the capacity to handle a task or a group of tasks, by setting in motion and orchestrating one’s own internal, cognitive, affective and motivational resources and utilizes the external resources available in a coherent and profitable manner (Pelleray, 2004; my translation).

Therefore, the interpretation underpinning the arguments to be made is that competencies are a systematic combination of knowledge, skills, attitudes and memory of past experiences that, depending on the needs arising from the different contexts and the objectives one intends to reach, are elegantly interwoven to produce efficient and effective behaviours. More specifically, this article focuses on the acquisition of transversal competencies, also referred to in literature as key or core competencies, which rather than being subject specific, represent the cross-curricular goals. They constitute a set of mutually-complementary tools which individuals “need to adapt to a variety of

[unpredictable] situations and to continue learning throughout life” (Gordon et al., 2009, p. 41).

### **Scope of the Research**

This research aims at providing an interdisciplinary overview of the transversal competencies identified over time to face the current era of complexity. A thorough literature review was conducted to identify the transversal competencies delineated over the years in economic, philosophical, psychological, sociological, health and educational fields. It then attempts to demonstrate the link between these competencies with the principles and properties proposed in the theory of simplicity by the professor of physiology of perception and action, Alain Berthoz (2012), and to illustrate how these competencies can be considered simplex tools indispensable for a successful life and wellbeing of individuals within a sustainable environment. In the final part, Home Economics education is presented as the ideal setting for the promotion of the said competencies, thanks to its interdisciplinary nature and its longstanding mission of achieving optimal and sustainable living.

### **The search for transversal competencies in an era of complexity**

A clear indication of the paradigm shift from knowledge-based curricula to competency-based learning and assessment can be traced back to the early 90s with the identification of key competencies and the focus on the promotion of lifelong learning on an economic, political and social level worldwide.

Following the OECD report (1994), which advocated curriculum reform to face the challenges characterising the twenty-first century, successive key initiatives have been taken on both European and international levels. The OECD itself elaborated the Definition and Selection of Competencies (DeSeCo) Programme, which formed the theoretical underpinnings for the Programme for International Student Assessment (PISA) (Ananiadou & Claro, 2009).

The aim of the DeSeCo project was to provide “a framework that could guide the longer-term extension of assessments into new competency domains ... [while PISA aimed at] ... monitoring the extent to which students near the end of compulsory schooling, at age 15, have acquired the knowledge and skills necessary” (Ananiadou & Claro, 2009, p. 7). As Rychen and Salganik (2003) outlined, among the notions which were emphasised throughout the programme, was that it approached “the question of competencies via the perspective of a successful life and a well-functioning society, conceiving the potential societal benefits of a well-educated citizenry as including a productive economy, democratic processes, social cohesion and peace” (Rychen & Salganik, 2003, p. 5). Secondly, importance was given to attitudes, motivation and values; non-cognitive factors that are not always attributable to formal education and which go beyond the assessment of knowledge and skills. The DeSeCo Programme identified three clusters of key competencies summarised below (OECD, 2005):

(1) *using tools interactively* to keep up to date with technologies, to adapt tools to own purposes and to conduct active dialogue with the world;

- (2) *interacting in heterogeneous groups* to deal with pluralistic societies, to instil the importance of empathy and social capital;
- (3) *acting autonomously* to realise one's identity and set goals in a complex world, to exercise rights and take responsibility and to understand one's environment and its functioning.

At the heart of this framework lies the ability of *reflective thought and action* which "demands relatively complex mental processes and requires the subject of a thought process to become the object" (OECD, 2005, p. 8).

In the same period, the report 'Learning: the treasure within' (Delors et al., 1996), was published by the International Commission on Education for the twenty-first century set up by UNESCO. In this document four pillars of education were proposed and are hereby briefly reported:

- (1) *learning to live together*: which focuses on the importance of understanding and appreciating diversity among cultures, religions and traditions and of recognising the growing interdependence to implement common projects and manage conflict;
- (2) *learning to know*: where the emphasis has to be on giving people a taste of knowledge, laying the basis for lifelong learning;
- (3) *learning to do*: which involves acquiring the necessary competencies to deal with a variety of situations, often unpredictable, and to engage in teamwork;
- (4) *learning to be*: which entails exercising good judgement combined with independence and a stronger sense of personal responsibility for the attainment of common goals (Delors et al., 1996, p. 22-24).

Meanwhile, the World Health Organisation (1994) provided the 'Guidelines to Facilitate the Development and Implementation of Life Skills Programmes' for children and adolescents in schools. The complementary life skills identified were paired to reveal 5 main life skills areas, which are the foundation for *psychosocial competency*. The core skills identified were: i) "decision making and problem solving", ii) "creative thinking and critical thinking", iii) "effective communication and interpersonal relationship skills", iv) "self-awareness and empathy", and v) "coping with emotions & coping with stress" (WHO, 1994, p. 14). On coping skills, Aaron Antonovsky (1979) postulated that individuals who have sufficient and adequate General Resistance Resources (GRRs) readily available can progressively develop a strong Sense of Coherence (SOC) (Suominen & Lindström, 2008). In synthesis, according to Antonovsky,

SOC expresses the extent to which one has a pervasive, enduring, though dynamic, feeling of confidence that (1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable and explicable; (2) the resources are available to one to meet the demands posed by the stimuli; and (3) these demands are challenges, worthy of investment and engagement (1987, p.19).

In order to face unpredictable situations, what is important is not the resources themselves, but the ability to make use of them whenever the need arises. People who perceive life in a comprehensive, manageable and meaningful manner, which respectively represent the cognitive, the instrumental and the motivational components, can be considered to have a strong SOC.

Following the ratification of the Lisbon Agenda, the wellbeing of citizens, social cohesion, economic development and competitiveness in the process of globalization became the focus of competency acquisition (Halász & Michel, 2011). Among these initiatives is the European Reference Framework on Key Competencies for Lifelong Learning (OJEU, 2006), listed below and of which five (italicised) are identified as transversal competencies:

- (1) communication in the mother tongue;
- (2) communication in the foreign languages;
- (3) mathematical competency and basic competencies in science and technology;
- (4) *digital competency*;
- (5) *learning to learn*;
- (6) *interpersonal, intercultural and social competencies and civic competencies*;
- (7) *entrepreneurship*; and
- (8) *cultural expression* (OJEU, 2006, Annex).

Three significant elements highlighted in the framework (OJEU, 2006, Annex) need to be summarised at this point. Firstly, it is pointed out that these “key competencies are those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment” and all should be regarded as equally important. Secondly, the competencies “overlap and interlock, [hence] aspects essential to one domain will support competence in another”. Thirdly, the themes that apply throughout this framework are: “critical thinking, creativity, initiative, problem solving, risk assessment, decision taking and constructive management of emotions”.

On a national level, reports from the OECD (2009) and European Commission [EC] (2012), show that much has been done in various countries for the promotion of key competencies through formal, non formal and informal education. Moreover, as outlined by Ananiadou and Claro (2009), initiatives from the private sector provide further evidence of the relevance of defining competence. In addition, core competency frameworks required to ensure better workforce capacity have been developed in various professional fields and higher education and training institutions on both regional and national levels, ranging from competencies for teaching in inclusive settings (EADSNE, 2012) to health promotion practice (Dempsey, Barry, Battle Kirk & the CompHP Project partners, 2011) to pharmacy (The Pharmaceutical Society of Ireland, 2013), and Higher Technical Instruction and Training (Frasson, 2011), to name a few.

Taking a closer look into the field of education one can find that the notion of competencies is not as innovative as the most recent prominent literature from the economic, political and private sectors may lead one to think. Great philosophers of all time, from Plato in *The Republic* (about 380BC) to Aristotle,

and more recently Rousseau in his book *Emile* (1762) and Dewey in his literary works *How We Think* (1910) and *Democracy and Education* (1916) have widely spoken on the need for mastery of different kinds of knowledge, which ranges from facts to complex analysis, civic and citizen competencies, and the centrality of critical thinking and reflection. Leading pedagogists had also pinpointed essential core competencies. Among other prominent figures, Freire in the *Pedagogy of the Oppressed* (1970; 1993), as outlined by Shaull (1993), was convinced “that every human being, no matter how ‘ignorant’ or submerged in the ‘culture of silence’ he or she may be, is capable of looking critically at the world in a dialogical encounter with others” (p. 14).

The French sociologist and philosopher Edgar Morin dedicated a book to The ‘*Seven Complex Lessons in Education for the Future*’ (Morin, 2001). Acknowledging complexity as a theoretical framework, Morin identified “seven facets of essential knowledge [that] should be covered, without exclusivity or exclusion, in education for the future in all societies in every culture, according to the means and rules appropriate to those societies and cultures” (p. 11). For the purpose of this article they are hereafter merely presented, taking into account the risk of offering a very reductive delineation of Morin’s thought should one try to explain them briefly:

- (1) Detecting error and illusion
- (2) Principles of pertinent knowledge
- (3) Teaching the human condition
- (4) Earth identity
- (5) Confronting uncertainties
- (6) Understanding each other
- (7) Ethics for the human genre (Morin, 2001)

In summary, complex modern society has raised the bar for the attainment of a ‘successful’ life and well-functioning sustainable society. As social scientists, it is not enough to accept that “complexity is out there, people are using it and the reason they are using it is because it makes sense of the real social systems being examined” (Byrne & Callaghan, 2014, p. 233). The competencies individuals need to be able to deal with the *unpredictability and instability* that characterizes today’s world have been identified and endorsed by leading world organisations. Researchers and policymakers, working collaboratively with schools and higher education institutions, are now urged to find strategies and tools that would make these competencies teachable. The aim of proposing the theory of simplicity as a possible solution is twofold: First, simplicity may provide an alternative framework to decipher the complexity that arises in the attempt of finding strategies to deliver and promote the acquisition of competencies in school contexts. Secondly, simplex properties and principles can be considered as the necessary competencies and skills individuals need in their twenty-first century survival kit, independent of the social construct in which they live, learn, work and recreate themselves.

## **The theory of simplicity as an underpinning theory for transversal competencies**

Although the neologism may sound as if it proposes an antonym of complexity, simplicity theory complements it and in no way denies the fundamental values of complexity. Simplicity shouldn't be considered a synonym of simplicity either, since the former includes tension whereas the latter "refers to the absence (or near absence) of complexity" (Gell-Mann, 1994 as cited in Berthoz, 2012, p. x).

Proposed by the physiologist and neuroscientist Alain Berthoz, the concept of simplicity is an ensemble of solutions that appeared in the course of evolution to allow living organisms to survive despite the complexity of natural processes. These biological devices or processes allow a complex adaptive system, as is the human being, to "process complex situations very rapidly, elegantly and efficiently, taking past experience into account and anticipating the future" (Berthoz, 2012, p. 3). Furthermore, by means of a fundamental principle of intersubjectivity, individuals are able to understand the intentions of others. From a competency-based perspective, these solutions can be defined as a set of skills living organisms use to prepare actions and foresee their consequences. Berthoz outlines that these same simplifying principles and properties may not only be observed in physiological processes, but may be applicable to all levels of human activity. As a matter of fact, although still relatively novel, simplicity theory has already been applied to various disciplines, such as education, to offer possible solutions to the complex and adaptive educational system. (Sibilo, 2014).

In his book 'Simplicity: Simplifying Principles for a Complex World' (2012), Berthoz suggests a preliminary list of basic characteristics of life that constitute the tools for life for the creation of different patterns of interaction among the constitutive parts of a system. In other words, these provide the theoretical underpinnings for the interpretation of the behaviour of complex adaptive systems. According to the author, these characteristics are:

- *Specialisation and modularity*, which is the breakdown of a complex task into various functions. This coexistence of diverse functions guarantees a simultaneous utilization of diverse adaptive schemes to facilitate better control of action (Sibilo, 2014). For example, in the human brain, different areas process specific aspects of perception, action, memory, and emotion, while in society, this modularity can be observed in the division of work.
- *Speed*, referring to the ability of decision making by anticipating and predicting consequences of actions, through the capitalization of the results of past experiences and guessing and betting on the behaviour of others. These are not necessarily simple solutions, but need to be rapid, elegant and effective. They are very often taken in milliseconds as the reaction of a living organism when faced with danger, or during a negotiation meeting where anticipating the possible reactions to an offer becomes crucial.
- *Reliability* which is needed to reduce the margin of error to a minimum. Within a complex world characterised by unpredictability, this



characteristic becomes indispensable for any adaptive system, especially in multilevel systems, to augment the possibility of success.

- *Flexibility, vicariance and adaptation to change*, which are essential to be able to select the right strategy from a repertoire of choices to resolve a problem, and perceive, capture, decide, or act depending on the context the system finds itself in. Hence all these are fundamental in decision making, problem solving, creative thinking, coping with stress and emotions, initiative taking and the spirit of entrepreneurship.
- *Memory*, as the characteristic on which present action relies to predict the future consequences of an action. There are multiple mechanisms of memory (explicit, implicit, episodic, verbal, iconic and effective).
- *Generalization*, the final property of complex adaptive systems, which refers to the competency of capitalizing patterns of interactions, and transferring these from one context to another, even if they are not two completely analogous situations.

As a guiding framework to delimit the concept of simplicity, Berthoz (2012) enlists six simplifying laws and principles, implemented successively or in parallel, to govern a simplex process. The author points out that the terms 'laws and principles' are used in the absence of anything better to describe simplex solutions, processes, architectures and even mechanical agents. The six principles are:

- *Inhibition and the principle of refusal*: In any thought process, whether it is a moment of reflection or when one is faced with an urgent decision to be made, selecting one action over another requires inhibiting all the actions one does not choose and disinhibiting the one acted. In creative thought, for example, one inhibits the automatic or learned solutions to make way for innovative ones.
- *The principle of specialisation and selection (Umwelt)*: Every species scans the world only from cues important to its survival, creating one's own *umwelt*; a subjective universe. This principle is parsimonious in that it involves the selection of pertinent information needed to reach the goal of action. "This selection is not only induced during a stimulus-response process. It is intrinsic to adopting a perspective, whereby a living, self-organising, autonomous organism projects its intentions and hypotheses onto the world" (Berthoz, 2012, p. 14). The ability to filter information and select what is essential is paramount to deal with complexity.
- *The principle of probabilistic anticipation*: Prediction is always probabilistic and hence, to take action, the brain has to make some hypotheses deciding on what probability that hypothesis has of being correct on the basis of the information available in the present, as well as taking the memory of past experiences into account. This prospective and retrospective exercise, coupled with comparison of sensory data is key to innovation.
- *The detour principle*: Living organisms possess numerous mechanisms that, by means of detours, facilitate the solution of nonlinear problems. This nonlinearity is what makes this principle key for survival. Shortcuts do exist, but as modern GPSs help us understand, sometimes taking the

longer way is more efficient in terms of time and fuel consumption to reach one's destination. Human beings often tend to think that the shorter way is the better solution. This may often mean resisting to change, or not considering alternative solutions which may well be more effective. Detouring, therefore, involves replacing a simple variable with a more complex mix of variables to simplify it.

- *The principle of cooperation and redundancy:* Cooperation refers to the process of combining the information available to ensure that the information is coherent and therefore reliable. The context, rules, points of view and previous decisions serve as frames of reference. Redundancy, on the other hand, refers to the duplication of components or functions of a system with the intention to increase reliability of the system to make it fail-safe. While *selection* (the second principle) reduces the number of available solutions, complex adaptive systems ensure they have several values for the same variable to mitigate the risk of error. Another example of cooperation and redundancy is looking at things from different perspectives when making decisions, egocentrically and allocentrically.
- *The principle of meaning* - This principle corresponds to the law that establishes the link and the functionality between meaning and the act itself (Sibilio, 2014). Focusing the attention on the act implies affirming the principle of meaning whose foundations are in the act itself, since "simplex solutions are motivated by intentions, goals, or functions" (Berthoz, 2012, p. 21).

Considering these principles and properties, one can sustain the proposal that the theory of simplicity offers a theoretical and organisational framework for transversal competencies of interest. This is because, as Berthoz postulates, the same organisational matrix can be observed in all complex adaptive systems from "a hive, an ant colony, a termite mound [to] an army, factory or society itself" (Berthoz, 2012, p. 76). The following table provides a synthesis of the transversal competencies and the respective skills, attributes, attitudes and behaviours identified in the various frameworks proposed over the years. These are grouped under two general competency domains: interactive use of tools and resources including digital competency and psychosocial competency, with the latter divided further into three sub-domains - i) Interpersonal, Intercultural, Social and Civic Competencies, ii) Intrapersonal Competencies and iii) Meta-cognitive Competencies. The skills, attributes, attitudes and behaviours for each of the four competency domains are then outlined and the overarching lessons proposed by Morin (2001) are grouped accordingly. The various principles inherent to each of the competency domain are suggested, whereas the properties provide the underpinning theoretical framework.

**Table 1. Synthesis of the transversal competencies identified and the theoretical underpinnings of simplicity**

Transversal Competencies	Interactive Use of Tools and Resources including Digital Competency	Psychosocial Competencies		
		Interpersonal, Intercultural, Social and Civic Competencies	Intrapersonal Competencies	Meta-cognitive Competencies
<b>Skills, Attributes, Attitudes &amp; Behaviours</b>	Learning to know; diagnosis and risk assessment	Learning to live together; maintaining relationships; cultural appreciation and expression; effective communication and interpersonal skills	Learning to do and learning to be; acting autonomously to face situations; self awareness and empathy; constructive management of emotions and stress; initiative and entrepreneurship	Learning to learn; critical, constructive and creative thought and action upon reflection; decision making and problem solving
<b>Overarching Lessons Proposed by Morin (2001)</b>	<ul style="list-style-type: none"> <li>• Detecting error and illusion</li> <li>• Principles of pertinent knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Understanding each other</li> <li>• Earth identity</li> <li>• Ethics for the human genre</li> </ul>	<ul style="list-style-type: none"> <li>• Teaching the human condition</li> </ul>	<ul style="list-style-type: none"> <li>• Confronting uncertainties</li> </ul>
<b>Simplex principles individuals need to be aware of and apply conscientiously for the acquisition of the different competencies (Berthoz, 2012)</b>	<ul style="list-style-type: none"> <li>• Inhibition and the principle of refusal</li> <li>• Principle of specialisation and selection</li> <li>• Principle of probabilistic anticipation</li> <li>• The detour principle</li> <li>• Principle of cooperation and redundancy</li> <li>• Principle of meaning</li> </ul>	<ul style="list-style-type: none"> <li>• Inhibition and the principle of refusal</li> <li>• Principle of specialisation and selection</li> <li>• Principle of probabilistic anticipation</li> <li>• The detour principle</li> <li>• Principle of cooperation and redundancy</li> <li>• Principle of meaning</li> </ul>	<ul style="list-style-type: none"> <li>• Inhibition and the principle of refusal</li> <li>• Principle of specialisation and selection</li> <li>• Principle of probabilistic anticipation</li> <li>• The detour principle</li> <li>• Principle of cooperation and redundancy</li> <li>• Principle of meaning</li> </ul>	<ul style="list-style-type: none"> <li>• Inhibition and the principle of refusal</li> <li>• Principle of specialisation and selection</li> <li>• Principle of probabilistic anticipation</li> <li>• The detour principle</li> <li>• Principle of cooperation and redundancy</li> <li>• Principle of meaning</li> </ul>
<b>Simplex Characteristics Underpinning all Competencies (Berthoz, 2012)</b> Specialisation and Modularity; Speed; Reliability; Flexibility, Vicariance and Adaptation to Change; Memory and Generalisation				

As can be observed from the table, all the simplex principles can be found at the basis of each single competency domain and thus can be considered as transversal tools or skills needed for competency acquisition. The key is to encourage individuals to gain consciousness of the interplay of the various

simplex principles in order to make sense of action and finally attribute a meaning to it.

### **Simplex principles as tools for life in Home Economics education**

Since its inception in the late 1800s Home Economics education has effectively kept up with the pace of time, prioritising the knowledge, skills and attitudes necessary to respond to world-wide change and development. Among the first issues dealt with were general health and hygiene, increasing women's rights and participation and promoting worthy home membership (Smith & de Zwart, 2010). Today it concerns food and nutrition education, financial literacy, parenting skills, the increasing complexity of family life, global citizenship and environmental health. As stated in the IFHE mission statement (2008):

this disciplinary diversity coupled with the aim of achieving optimal and sustainable living means that home economics has the potential to be influential in all sectors of society by intervening and transforming political, social, cultural, ecological, economic and technological systems, at glocal levels. This is driven by the ethics of the profession, based on the values of caring, sharing, justice, responsibility, communicating, reflection and visionary foresight.

Practically all the skills, attitudes, attributes and behaviours summarised in Table 1 can be traced in Home Economics curricula taught at different stages of schooling or in the community. Simultaneously, the overarching lessons proposed by Morin (2011) are also addressed.

For example, the US National Standards for Family & Consumer Sciences is based on a practical problems approach, encouraging high quality reasoning (NASAFACS, 2008). Family & Consumer Sciences (as Home Economics is known in the US) is seen as providing a vehicle for students to take greater initiative and responsibility for their learning and to develop values-based knowledge and skills for the rapidly changing environments they will experience across their life span. A practical reasoning process is emphasised where learners examine and consciously develop goals or valued ends, interpret contextual information, obtain and use technical information and skills, consider the available or possible alternative actions and consequences and decide what action to pursue (Brown & Paulucci, 1979). Home Economics education serves to guide learners to engage in thinking, reasoning, and reflecting on content as structured around contextual problems to be solved. The focus is on "what should we do?" questions sensitive to the fact that circumstances are often uncertain and changing.

This approach can be seen more concretely if one considers as an example the Maltese Home Economics Senior Secondary school syllabus. The aims envisaged for this three-year course are listed below:

- to increase the candidates' knowledge and understanding of the changing physical, social, emotional, intellectual and aesthetic needs of people throughout their life cycle.
- to develop the ability to communicate, share, make informed decisions to enhance positive family values.
- to develop the knowledge, understanding, skills and attitudes necessary to meet nutritional recommendations and healthy lifestyles.
- to develop the knowledge and competencies required for the effective and safe organisation and management of relevant resources.
- to enable candidates to develop the necessary skills to respond effectively to rapid technological changes and to scientific development.
- to develop the qualities of sensitivity and aesthetic appreciation needed to create and maintain a healthy and pleasing environment.
- to create a sensitive caring attitude and to foster a concern for the general environment so as to enable candidates to choose and use consumer goods carefully, thus contributing towards the conservation of the environment.
- to instil the need for a critical assessment of consumer goods, an awareness of advertising pressures and a knowledge of consumer rights and responsibilities.
- to foster a critical and analytical approach to decision making and problem solving.
- to encourage creativity, originality and academic rigour (University of Malta, 2012, p. 2).

The above aims clearly reflect how Home Economics education strives to develop responsible citizens who can call upon scientific knowledge and apply it in a reasoned, efficient and fair manner to tackle current and future life problems. It does this through adopting an active learning, emancipatory, socio-constructivist approach to teaching where everyday situations are addressed through exposing, demonstrating and practising the tools for successful solution of problems in tried-and-tested but also creative and innovative ways (Piscopo & Muglietti, 2012). The theoretical, practical and investigative components of the discipline offer a myriad of opportunities for students, whatever their age, to reflect upon and reassess values and to acquire these skills, attributes and attitudes that encourage behaviours with human wellbeing and betterment as the goal. For example, Piscopo (2015) has argued how Home Economics literacy could help to resolve the dilemma of resorting to usage of convenience foods in the present day fast-paced life, whilst still embracing principles of sustainable consumption. She showed how Home Economics could be used to discuss this common problem, find the best available solution in each individual's or family's circumstances and take the necessary action. This would be done through utilising available knowledge and skills, sourcing new knowledge, becoming familiar with and practising new skills, and critically evaluating the various processes and outcomes. Adding the simplex principles as a framework to explore and resolve dilemmas such as this, but also many of the choices and behaviours typically addressed via Home Economics curricula worldwide

would add breadth to the options considered and layers of depth to the thinking behind decisions made. Home Economics education has indeed been shown to be effective as a tool for preparing for future societal needs and for lifelong learning (Pendergast, McGregor & Turkki, 2012; Piscopo, 2014). Simplex principles can make such learning experiences more meaningful, broadly applicable and lasting.

### Conclusions

The current era presents students and teachers alike with plenty of challenges in their day to day lives. As evidenced in this article, it has now been widely acknowledged that gaining control of one's own life course requires a high degree of awareness of the underpinning characteristics of interaction, intricately interwoven on micro, meso and macro levels, of complex adaptive systems to be able to comprehend and give meaning to everyday situations. The theory of simplicity, although not necessarily exhaustive (Berthoz, 2012), identifies these characteristics and provides the tools necessary to decipher these interactions. Equipping students and teachers with these tools may help them to face the complexity in their work, studies and daily lives with a new mindset. Deliberately including activities to promote reflection on these properties and principles in Home Economics education has been suggested because of the subject's interdisciplinary and practical nature. Yet, these can be equally effectively applied cross-curricularly, thus ensuring that all students will have been given the opportunity to gain awareness of and be able to apply them to face the complexity emerging throughout their school life as well as in their everyday lives.

An overarching challenge remains that of creating effective systems which guarantee that such strategies are actually applied and that evidence of their effectiveness can be adequately measured. School curricula need to be oriented towards competency acquisition, encourage interdisciplinary approaches to reduce overlap among subjects taught and capitalise formative and performance-based assessment to promote more hands-on collaborative experiences in classrooms. This, in turn, involves reformulating initial and in-service teacher education to ensure that teachers are equipped with the necessary competencies and also have the knowledge, skills and attitudes necessary to put such competencies into practice in their day-to-day teaching. Finally, students need to be enticed to reconsider their role in the teaching-learning process from mere passive recipients to active constructors of their own knowledge and skills through reflective practice in action and on action for the acquisition of the transversal competencies outlined.

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