Chapter 4

Synergising Action Research and Technology Education: A Pedagogical Perspective

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ABSTRACT

Design process is a dominant method (backbone) for teaching the Technology Education subject in schools which demands critical and creative thinking skills. Moreover, the design process is research orientated, which could jell well with action research. This chapter explores the synergy between Technology Education and action research, and ultimately contributes a theoretical pedagogical framework which could help in teaching Technology by consciously pulling in action research principles into the design process, thus helping also to approach design process as a cyclical rather than a process.

INTRODUCTION

Can the design process, which is the method for teaching Technology, be driven by action research? The answer is yes. Both design process and action research involve problem solving approaches, which entail identifying and investigating the problem, designing a solution to the problem, (making the solution in Technology Education), evaluating the solution and making adjustable improvements if need be (Ferrance, 2000; Eggert cited in Williams, 2011). Though Technology Education is a school subject and action research a research design under research methodologies, it is important to note that the method of teaching Technology, that is to say design process, is inherently research orientated. Most importantly, the design process engages the above steps in a cyclical manner, which needs learners’ reflective and critical thinking skills. On the other hand, action research also involves steps which should be executed cyclically. These similarities lead to synergy between Technology Education and action research (Mapotsse, 2012; Merrill, 2017) and ultimately contribute towards enhancing the teaching of Technology. In this chapter I explore this synergy and contribute a framework which can concientise Technology Education teachers to enrich their pedagogical strategies by consciously involving action research in their teach-
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This jells well with the theme of this book. The framework in question is formed on an understanding of Technology, Technology Education, design process, action research and constructivist learning, which are discussed subsequently. An indigenous perspective is entertained in the discussion due to the diverse nature of learners in many educational contexts.

CONCEPTUAL FRAMEWORK

Technology

The word “technology” seems to be overused but with little insight (Mapotse, 2012:15), hence it is uneasy to define it (Heidegger, 1977; Dugger 2008; Li-Hua, 2009; Misa, 2009; Mapotse, 2012). Its overuse is caused by the fact that life on earth seems unliveable without technology – technology surrounds and ‘lives’ with us: it is evident in our eating, bathing, sleeping, traveling, working, etc. It is also evident in the processes and methods we follow and the tools, knowledge and materials we use. Why then is it uneasy to define technology? The high speed at which technology changes, different cultures and different versions of technology applied in different contexts are all behind this uneasiness. However, attempts have been made to define technology. A few are considered subsequently.

Technology generally refers to what has been described as high technology in an industrial context, for example computers, superconductivity, chips, genetic engineering, robotics, magnetic railways, etc. (Li-Hua, 2009, p. 18). Technology can also be defined as the technical means that people use to improve their surroundings (Kalanda, 2005). According to Ankiewicz, De Swart and Stark (2000, p. 40), technology concerns technological knowledge, skills and technological processes and it involves the understanding of the impact of technology on the individual and society. The definition by Ankiewicz, De Swart and Stark lies very close to that of the (South African) Department of Basic Education (DBE): “the use of knowledge, skills, values and resources to meet people’s needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration” (2011, p. 8).

Then there is an indigenous perspective to the definition of technology. Obikeze (2011) defines technology as any human-made or culture-generated devices, formulations or organisations that may be used for purposes of producing or creating needed goods and services. This production happens by employing tangible (material) and intangible (non-material) forms of technology, which root technology in a cultural context (Ogungbure, 2011). Tangible and intangible devices, formulations and techniques fulfil some need or provide some service for humankind in a given environment (Moalosi, Popovic, Hudson & Kumar 2005; Obikeze, 2011).

Three categories of devices include the following:

1. Material (physical) technology, for example bows and arrows, ploughs, looms, laboratories, machines, electronic devices, knives, fishing nets and explosives.
2. Social technology, for example methodologies, techniques, organisational and management skills, bookkeeping and accounting procedures, negotiating and counselling techniques and social institutions like patriarchy and women’s league, songs, jokes, ideas and skills.
3. Communication technology, for example language, signs and symbols, drumming and the internet.