An extract from Chris Roe's thesis: *Computers for learning: an EM perspective* **(Chapter 4, page 106)**

Constructionism has its basis in the theory of constructivism [Pap80]. In addition to the active building of knowledge structures, Papert claims that construction that takes place in the head often happens especially felicitously when it is supported by construction of a more public sort 'in the world' [PH91]. By 'in the world', Papert means that the public nature of a constructed artefact enables discussion, examination, probing and admiration [Pap93]. Although the theory of constructionism was originally introduced with reference to children, it is relevant across all age groups, as Papert demonstrated by describing examples from his own learning processes [Pap80]. Knowles's andragogical model of adult learning is related to constructionism and places emphasis on self-direction, positive use of previous experience and internal motivation [Kno70, Kno90]. The important connection between andragogy and constructionism is the emphasis placed on the active role of the learner. The constructionist emphasis in learning is on the process, not on the product [KR96]. Jonassen supports the idea that constructionist educational software emphasises the process of knowledge construction as being more important than the resulting product: 'if meaning is determined by the mental processes of the individual, and these processes are grounded in perception and grow out of experience, then those are the things we should evaluate – not the extant behaviour or the product of that behaviour' [Jon92].

Ostwald endorses this emphasis on process over product in learning in his study of knowledge construction in software development [Ost96]. In his view, the building of artefacts enables us to learn through their construction, through experimentation (to see how they work) and through modification (to make them 'better'). He claims that the construction of an artefact and its understanding proceed in tandem: 'Experiential artefacts allow us to interact with the world. They provide information that enables us to interpret a situation through our perceptions. The danger is that they don't provide us with the knowledge – they provide us with information that is tacitly interpreted. When what we perceive is different from what we tacitly expect, a breakdown occurs, and the cause of this breakdown is brought to the surface where it can be interpreted and knowledge can be constructed' [Ost96]. The personal construction of artefacts is quite a different kind of activity from the assimilation of material designed by others. A constructionist perspective is well aligned with the learning activities at the concrete, empirical end of the EFL and an instructionist perspective is well aligned with the activities at the formal, theoretical end (cf. Figure 4.1).