Introduction

LISTENING, MULTIMEDIA, AND OPTIMUM DESIGN

Listening

Listening is "…a term used in language studies and language education to refer … to a set of cognitive interactions involved in oral language processing" (Rost, 1994, p. 3778). It is also added that listening is "... the process of deriving meaning from sound" (ibid). The Chambers Encyclopaedic English Dictionary (CEED) defines listening as "to give attention so as to hear something to follow advice".

Moreover, Vanderplank (1988, p. 32) says: "… listening can be seen as … following and understanding…. Following … is closely connected with the intelligibility of a message. That is, can a listener repeat the message aloud, sub-vocally, or in the mind's eye?" Furthermore, Bacon (1992, p. 388) says: "the act of listening involves an interaction of input, task, and individual variables".

As seen, there are different definitions of 'listening'. All these definitions provide us with some key features. These are: 'a set of cognitive interactions in processing'; 'the process of deriving meaning from sound'; 'giving attention'; 'following, understanding and repeating/producing'; 'the interaction of input, task and individual variables'. However, everything is not yet crystal-clear. Therefore, this term needs to be discussed more. Then, what does listening mean? Is it a term related to only language studies? Is it always a process of deriving meaning from sound? Is it always a process of following only advice? To answer these questions correctly, firstly a comparison should be made, to some extent, between first language (L1) and second language (L2) listening. Inevitably, there are many -similarities in L1 and L2 listening such as following speech, trying to understand it, and, in some cases, answering. Apart from these similarities, there are some more aspects of foreign/second language (FL/SL) listening, not all of which are indicated clearly in the above definitions. Such features can vary depending on (a) the characteristics of language learners, (b) the characteristics of listening input, (c) listening purposes and (d) learning objectives. Language learners, for instance, sometimes:

- Only listen to acquire the correct pronunciation, stress and intonation, as these features are important elements of listening texts and possess a role in understanding (Goh, 2000, p. 59; Anderson-Hsieh, 1992, p. 52; Ur, 1992, p. 13; Richards, 1983, p. 226)
- Only focus on grammatical structures (i.e. syntax) to find out how such structures are used in the target language, as syntax plays an important role in comprehension and foreign/second language learning (FLL/SLL; Conrad, 1989, p. 14). Let us, for instance, say that language learners hear such a sentence in a listening text: 'Minority people *could have*, and *should have*, *been* given equal

rights by the modern states'. If language learners do not know what "*could have*", "*should have*" (i.e. unrealised/undone modal auxiliaries in past) and also "*been*" (i.e. passive voice), mean, then naturally and logically they cannot be expected to comprehend what they hear. It is because of this Conrad (1989, p. 14) says: "Knowledge of TL [target language] syntax seems to be an important factor in increasing the amount of linguistic material that can be retained by short memory".

- Pay attention to unfamiliar items (i.e. lexis), as they might think that it is important at that particular time to understand that particular unfamiliar lexis or learn new language items. Moreover, an unfamiliar lexis is another element that might cause difficulty for language learners in understanding listening texts (Turel, 2014b; Chung & Huang, 1998, pp. 559-60; Underwood, 1993, p. 17).
- Follow each sentence and try to translate it into L1 (i.e. providing equivalents of L2 in L1). This is mostly done in the early stages of language learning process (Eastman, 1987, p. 198; O'Malley, Chamot, Stewner-Manzanares, Kupper & Russo, 1985a, p. 40), which does not help comprehension and acquisition a lot (Goh, 2002, p. 192; Goh, 2000, pp. 62, 67, 69). Not only do native speakers ordinarily not use translation strategy, but also this strategy is not accepted as a highly efficient strategy (O'Malley et al., 1985a, p. 39), as translation slows down processing and takes language learners' attention away from clues that might assist comprehension (Goh, 2002, p. 192).
- Listen to understand the surface meaning (main idea) of the listening input (i.e. involves actual understanding of listening input, initially main ideas). This is, maybe, the most global type of listening function that language learners carry out. This is common in L1 listening, as well. In fact, in real life when we listen to listening texts in L1, we sometimes only focus on the main ideas owing to the circumstances because either we do not want to comprehend in detail or due to other reasons such as not being interested in the topic. It might be because of such similarities that the proponents of the procedural skills hypothesis (i.e. the nature of individual skill in native speakers - NSs - and non-native speakers – NNSs - is the same although the ability is acquired gradually) claim "there is no fundamental difference in language processing between NNS and NS…" (Pienemann, 2001, p. 335).
- Listen to understand the deeper meaning of the listening input (i.e. syntax, social- and culture-based meanings, the illocutionary forces/a speaker's intention), which is also done in L1 listening
- Listen/view to understand not only what they hear but also the non-verbal aspects of the segments, as the meaning of listening input does not always consist of only words, which is also the case in L1 listening. Non-verbal aspects of listening texts and situations might sometimes play a vital role in comprehension. To this end, Oxford (1993, p. 207) even claims that in some cases "as much as 93% of the total meaning of any interaction comes from non-verbal, often visual, clues", an idea which might not be agreed on by everyone.

In other words, for language learners, listening*:*

- Is not a process of deriving meaning *every time*
- Is not a process of *hearing* something because *hearing*, as defined in Collins Cobuild Dictionary (CCD), is "a sense that makes it possible for us to be aware of sound." As understood here, hearing is a sense which enables us to be aware of sound regardless of whether we want to hear or not such as *noise*, *chatting*, *shouting*, *crying*, *swearing*, *music* and *so on*. In listening, language learners consciously follow speech, someone talking, news and so on to, in general, grasp meaning and sometimes for other indicated purposes.

- Is not *only* a process of following. It is more a process of understanding which is carried out by using world - (social and cultural) knowledge, comprehension clues, listening strategies, and contextual references (Weissenrieder 1987, p. 23; Long, 1989, p. 32; O'Malley, Chamot & Kupper, 1989, pp. 431-32).
- Is not a process of tuning in to a listening text or someone unconsciously and unintentionally. Conversely, listening requires careful attention and it is mostly on purpose, otherwise it will be *hearing*, not *listening*

All of these, of course, are not exactly what language learners always do when they listen to/view listening texts. These are only some of the approaches that language learners follow when they listen to listening input. It is because of these different listening purposes that the types of listening are categorised into different groups such as (1) empathic listening (requires focusing on facts and emotional content), (2) appreciative listening (includes listening to enjoy), (3) critical listening (focuses on analysing and indicating the importance of arguments), and (4) relational listening (requires a holistic approach by paying attention to the whole material; (Oxford, 1993, p. 208-89;Vo, 2015; Coakley & Wolvin, 1995).

Comprehension

Comprehension is defined, in the CCD, as "full knowledge and understanding of the meaning of something", while Lund (1991, p. 196) says "… the construction of meaning using both the decoded language and the comprehender's prior knowledge". According to Faerch and Kasper (1986, p. 264-65) when input and knowledge match each other, then comprehension occurs, but this matching is not perfect as a rule because of the gaps which regularly occur either in the recipient's or in the interlocutor's sources. They say that the comprehension process relies on three types of information:

… linguistic and other communicative input, the recipient's linguistic and other (socio-cultural, world) knowledge, and contextual information deriving from the situational context and the linguistic co-text (ibid: 264).

In the CEED, comprehension is defined as "the process of power of understanding; the scope or range of one's knowledge or understanding", while Chapelle (1998, p. 28) goes further and categorizes comprehension into 'semantic comprehension', which is considered the more difficult process (Carroll, 1977, p. 505), and 'syntactic comprehension'. Comprehension, alternatively, can also be defined as our general capacity to think, and solve problems by using all available (verbal, visual, situational, contextual etc.) input depending on our transactional (information seeking) objectives (Figure 1).

Figure 1. Listening comprehension

INPUT ➡ LISTENING = COMPREHENSİON

According to Anderson's (1995, p. 379) comprehension framework, comprehension consists of perception (i.e. the encoding of the input), parsing (i.e. the transformation of words into mental representation) and utilisation (i.e. relating mental representations to existing knowledge/elaboration, which enables to store in long-term memory).

Understanding

Understanding, according to Vanderplank (1988, p. 32), "… involves much wider notions such as prior or pragmatic knowledge, ability to follow argument, contextual relevance, insider information, etc.". According to Rost (1994, p. 3799) understanding is "...an optimal interaction between comprehension of the oral input and interpretation of that input in the situational context". These definitions shed invaluable light on this term. The definitions reveal different variables such as input (Faerch & Kasper, 1986, p. 264-5), language learners' linguistic and world knowledge (ibid), contextual information, meaning of 'input', construction of meaning, target culture (Turel, 2014c; Turel & Kilic, 2014; Platt & Brooks, 2002, p. 369; Kohn, 2001, p. 254; McLoughlin & Oliver, 2000, p. 59; Vygotsky, p. 1978), syntactic and lexical comprehension (Hegelheimer & Chapelle, 2000, p. 42; Smith, 2003, p. 52), encoding, transformation of words into representations, elaboration, long-term memory, ability to follow, optimal interaction and interpretations (Brown, 1978, p. 59; Eastman, 1991, p. 185) play an important role in understanding. For us, in terms of listening skills, comprehension and understanding, as can also be derived from the definitions, mean more or less the same thing, but in order to make them clearer we need to discuss them a bit further.

Firstly, it should be known that it is not always possible for language learners to fully comprehend or understand. Maybe this is not often possible in L1 listening, as well. To this end, Brown and Yule (1992, p. 57) emphasise: "…a 100 percent notion. What native-listeners operate with are partial, reasonable interpretations of what they are listening to…".

It is de facto that language learners do not always want to fully comprehend, as a result of their transactional goals. The degree of the process of power of comprehension/understanding is largely dependent on the learners' transactional (information seeking) objectives; interpersonal aims; abilities; linguistic (language), social cultural and world knowledge. Partly to this end, Porter and Roberts (1981, p. 42) state: "… we understand a TL [target language] at different levels according to our ability to use linguistic clues and situational and paralinguistic information". Let us say that we listen to a news programme particularly to find out what has happened as a result of an incident, not where and when it happened because of our transactional objectives. Then, inevitably, we will not follow and focus on when and where that particular incident has occurred, as we are not interested in full understanding, and only interested in something specific. To this end, Oxford (1993, p. 206) says: "Not everything to which a student is exposed becomes 'intake', only the part that is significant and to which the student is paying attention".

In the same way, comprehension/understanding is not always a process of using information and solving problems. If language learners are supposed to listen to listening texts and answer questions about them, find out something specific or solve the problem, then it can be said that it is a process of using information and solving problems. Let us imagine that language learners listen to a radio programme about which they do not have any pre-knowledge and only want to know what it is about. In the same way, the learners are not also requested to complete any task. In such a case, firstly, the learners cannot use any pre-information and solve the problems, as they lack it. Secondly, the learners' transactional objectives do not also necessitate them to understand in detail and to use this information to solve problems, answer questions or analyse it. Is this a process of using information and solving problems?

Therefore, in terms of language learners, it can be said that comprehension/understanding is, in general, a process of deriving meaning from the listening texts they tune in to. This process is also conscious and on purpose, which not only targets deriving meaning, but also targets acquiring the other aspects of the target language in any possible way. The degree of this process is largely dependent on language learners' level; their age, level of intelligence (i.e. fast/slow language learners; Gardner, 1985, p. 23), gender (ibid: 43); their learning style preferences (Carson & Longhini, 2002, p. 408; McLoughlin, 1999, pp. 222-23; Brickell, 1993, p. 103) and the strategies they use (Hurd, Beaven & Ortega, 2001, p. 342; Cohen, 1998, p. 5; Chamot & O'Malley, 1994, p. 371); their transactional objectives (Oxford, 1993, p. 206); world knowledge and linguistic knowledge (Porter & Roberts, 1981, p. 42); the difficulty/ease of the listening texts (Anderson & Lynch, 1989, pp. 6, 56; Rixon, 1992, p. 65; Underwood, 1993, p. 17); and contextual information (i.e. visuals, knowledge about the structure of the listening text/formal schemata -e.g. news programme or event: pre-thematic - the beginning -, thematic -main -, and posthematic context - the end of the story; Faerch & Kasper, 1986, p. 264). Regarding individual differences, Bacon (1992, pp. 399-400) points out: "Individual learner variables such as attitude and motivation, background knowledge, perceptual style, previous language-learning experience, and learning strategies all contribute to how a listener will interact with input". Due to these factors, language learners approach listening input in different ways, which results in comprehension/understanding or interpretation in diverse ways. In terms of many aspects, this process is also valid for L1 comprehension.

Listening Comprehension

Listening comprehension is "... being able to understand native speech at normal speed in unstructured situations" (Geddes & White, 1978, p. 38). Regarding language learners' listening comprehension, Brown (1978, p. 59) and Eastman (1991, p. 185) state that language learners have to be prepared and encouraged to target a reasonable, logical and acceptable interpretation rather than a 'correct' interpretation. However, when someone looks at the definition of listening comprehension, it might be significantly important in terms of which approach listening comprehension is defined, as each approach in listening gives priority to different aspects of listening comprehension. Byrnes (1984, pp. 317-78), for example, groups listening comprehension into three approaches, and in each approach the focus is different: (a) A linguistic approach: this approach indicates how listeners arrive at a structural description of a listening text (sentence) based on the phonological, syntactic and semantic aspects. (2) A conceptual approach: it focuses on how a listener puts a conceptual structure into a linguistic input (a non-linguistic onto a linguistic-structure). (3) A communicative approach: this approach sees listening comprehension as a result of a transactional interaction between a speaker and a listener. It is achieved successfully particularly when the listeners identify the illocutionary forces (i.e. the force of a sentence/a speaker's intention). It focuses on meaning, not on form, and functions as a part of an integrated-skill approach.

Moreover, there are many factors that affect listening comprehension. These are: (a) learners' characteristics (i.e. their age, L1 listening ability, L2 proficiency/level, vocabulary development in L2, - Vandergrift, 2006 -; level of intelligence, learning-style-preferences, learning effectiveness, transactional objectives, psychological readiness and willingness, - which is also considered one of the main components of autonomy, e.g. Littlewood, 1996, p. 428, 1997, p. 82 -; their experience in the target language, familiarity with the target culture and topic, world and social-cultural knowledge and so on, e.g. Turel, 2014c; Turel &Kilic, 2014), (b) input related factors (i.e. length and amount of input, cultural differences, subject matter, coherence, types of language input, unfamiliar items, discourse marks, the

difficulty or ease of the listening input/level of input,, the presence or absence of comprehension clues, tasks, information organisation, lexis, syntax) and (c) sound related factors (i.e. speech rate; voice and background noise; pause and hesitation phenomena; stress, intonation, and rhythm patterns; the number of speakers; expertness and the gender of speakers; accent; Turel, 2014b; Leveridge & Yang, 2014; Yang & Chang, 2014; Chen, 2011). In other words, when language learners listen to/view or are exposed to listening input, their personal characteristics, and input and sound related factors play a vital role in full-/half-/mis-comprehension of listening input. In short, listening comprehension is the process of many interweaved multifaceted cognitive processes (Diao, Chandler, & Sweller, 2007; Chang, Tseng, & Tseng, 2011; Meinardi, 2009; Goh & Taib, 2006; Wipf, 1984).

In terms of learners (and teachers) of a language as an FL/SL, it can be said that listening comprehension is a way of partial or total matching. This matching is between what language learners tune in to (i.e. linguistic and other communicative input/what the interlocutor says) and the resources the learners have. The resources can be: world, social-cultural and linguistic knowledge; abilities; strategies –cognitive and meta-cognitive -; contextual (processing) references in the form of textual references (i.e. Mary and John - they), referential connections (i.e. the verbal system and the visual representation system) or situational references (i.e. subsequent - the current similar event - and prior references - the previous similar event); skills and the linguistic co-text (i.e. the linguistic environment/context). These resources help learners grasp and arrive at an acceptable, logical and reasonable interpretation of the listening input. The degree of the power of this matching is largely dependent on the degree of using the above-mentioned sources effectively. The better language learners can use these sources and apply effective strategies, the better they can fulfil listening comprehension, which might mean that the listening comprehension process is complete and (close to) perfect. In short, listening comprehension in foreign/second language acquisition (FLA/SLA) occurs through the phases of language learning process shown in Figure 2.

What does Figure 1 mean? To comprehend listening input, language learners:

- Need to be provided with *comprehensible input*. The assumption underlying this is that if language learners comprehend, then they can acquire FL/SL (see Vidal, 2003, p. 79 about the role of comprehension in vocabulary gain). Carroll (1977, p. 500) also says: "… when comprehension is successful, the person presumably has learned something he has not known before and has thus achieved a new kind of competence,' Additionally, Long (1983, p. 138) points out: "It is widely assumed… that samples… heard but not understood by a would-be acquirer… serve no useful purpose in the SLA process. Only comprehensible input will do". There is, however, a point about 'comprehension' that needs to be emphasised here. Comprehension that takes place through a combination of semantic and syntactic processing can make the linguistic characteristic of the input 'intake' and this holds the potential for developing the language learners' linguistic system (Chapelle, 1998, p. 23). In addition to *comprehensible input*, Krashen (1982, p. 21) manages to draw our attention to another vital point: "We acquire … only when we understand language that contains structure that is 'a little beyond' where we are now". In fact, Krashen is not the one who mentions this first. Casambre (1962, p. 166), for example, says: "'… a certain degree of difficulty is necessary to make subjects learn and retain the material with greater permanence. Pedagogically, it means that 'spoon-feeding' should be avoided".
- Use linguistic input (i.e. titles, grammatical structures, words, phrases, clauses, prefixes and suffixes, stress and intonation and international cognates). Here the difficulty or easiness of the listening text plays an important role. If they, for example, feature many unfamiliar items such as nouns,

Figure 2. The framework of the phases of listening comprehension in FLA/SLA process
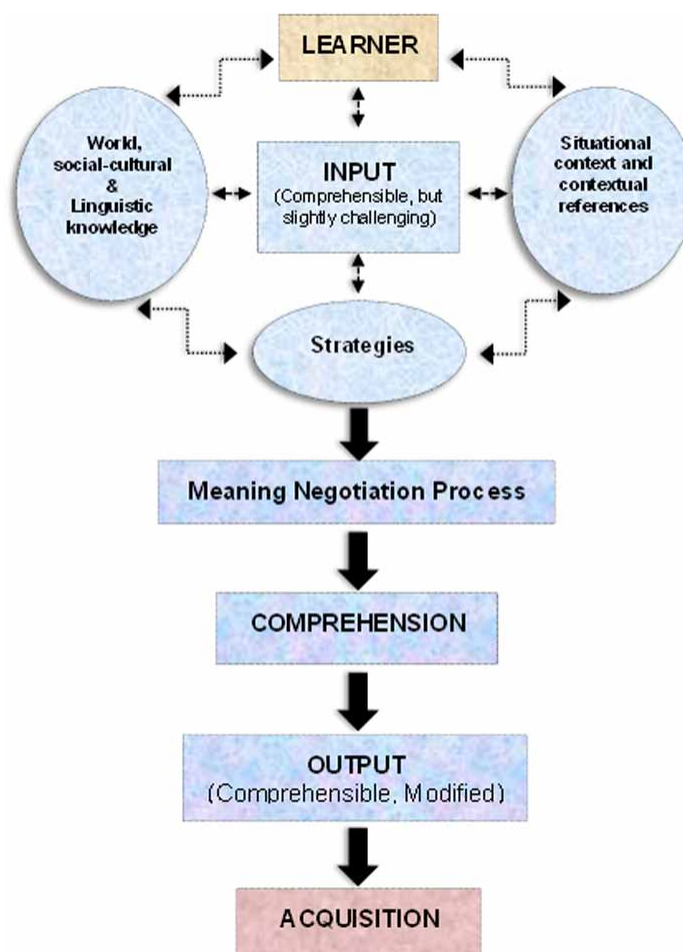
verbs, phrasal verbs, idioms, grammatical structures (Underwood, 1993, p. 17; O'Malley et al., 1989, p. 428; Markham & Latham, 1987, 168) and strong-regional dialects (Turel, 2004, p. 87), then inevitably these will hinder listening comprehension (Rivers, 1981, p. 164; Boyle, 1984, p. 35; Anderson & Lynch, 1989, pp. 6, 56).

- Utilise available comprehension aids (i.e. supplementary aids) such as facial gestures, diagrams, imaginary drawings, cartoons, charts, still or motion pictures, maps, key words, captions and the like. While their presence can in general increase and improve listening comprehension, similarly their absence can also, to a great extent, handicap (Turel, 2014d; Jones, 2003, 2004, 2006, 2009; Jones & Plass, 2002; Arnold & Brooks, 1976, pp. 711-16; Omaggio, 1979, pp. 112-15; Mueller, 1980, pp. 335-40).

- Use their world and social-cultural knowledge of subject-matter, and their target language information, and then match it with what they hear. This can be a great aid in terms of enhancing listening comprehension (Long, 1990, pp. 65-80; Weissenrieder, 1987, p. 23; Markham & Latham, 1987, p. 168). The degree of using such informational sources to their advantage is dependent on the amount of such knowledge language learners have, and the capacity and capability of using it (i.e. the use of affective strategies, Turel, 2004, pp. 107-08).

- Use situational contexts and contextual references (i.e. subsequent and prior reference). On encountering listening, for instance, a listening text related to 'seeing a doctor', language learners can roughly guess what a doctor-and-a-patient conversation might consist of. Such a situational context can help language learners to narrow their scope and focus, which can result in better grasping and understanding. Language learners also use contextual references providing that they have. In the above example, language learners can make use of their previous experiences related to doctor-patient context (prior reference) to understand the 'seeing a doctor' listening text (the subsequent reference).

- Apply listening strategies such as (a) meta-cognitive strategies – advance organisers, directed attention, selective attention, self-management, advance preparation, self-monitoring, delayed production, self-evaluation, self-reinforcement-. (b) cognitive strategies – repetition, resourcing, directed physical response, translation, grouping, note taking, deduction, recombination, imagery, auditory representation, key-word, contextualization, elaboration, transfer, inferencing, question for clarification-. (c) social strategies, (d) affective strategies (O'Malley et al., 1985a; O'Malley, Chamot, Stewner-Manzanares, Russo & Kupper, 1985b; O'Malley & Chamot, 1990; Bacon, 1992).

- These processing stages, which are known as 'meaning-negotiation process' lead to *comprehension*, which can result in productive practice (i.e. *output*) in the target language (Ortega, 1997, p. 87). Produced comprehensible (modified) output can aid language learners to become aware of linguistic problems that may further help them to modify/develop their output. As a result, language learners might be forced into a more syntactic-processing mode (Chapelle, 1997, pp. 25-6), which is called *ideal comprehensible output*. This is considered an important contributor to language development both at linguistic and semantic level (Chapelle, 1998, p. 28). For instance, let us assume that a language learner listens to a native speaker (NS) who says what they bought the day before. After listening, the language learner says: 'I see, you buy**ed** a book yesterday' and the NS says: 'Yes, I **bought** a book'. In this example, after a successful comprehension process, the language learner produces output, which is comprehensible at semantic level, but problematic only at linguistic (i.e. grammar/syntax) level, and therefore receives (implicit) feedback. This can force the language learner into a more syntactic process (especially when output is corrected explicitly or more correctly when feedback as well as the produced problematic output manages to attract the learners' attention to syntactic, lexical and/or semantic features that are problematic). Not only can this ultimately help language learners realise their mistakes, but it can also provide them with the opportunity to modify/develop the produced problematic output as a result of productive practice and received (implicit/explicit) feedback. It is because of this that Chapelle (1998, p. 24) says error correction affords the opportunity to "focus on form" (Long, 1988)' and "focus on form is expected to be beneficial when it occurs during the process of attempting to construct meanings". This process, which is referred to as 'negotiation of meaning' (Harrington & Levy, 2001, p. 15; Hegelheimer & Chapelle, 2000, p. 42; Long, 1996), however, mostly occurs during comprehension/communication breakdown when language learners are confused about meaning or syntax (Hegelheimer & Chapelle, 2000, p. 42; Smith, 2003, p. 52). Once, for example, the author of this study heard a child at the age of Key stage 2 (KS2) calling another child at the age of KS1 'gay'. The author got confused (the meaning-negotiation process began), as a child could not be a gay. After negotiating with an NS, he found out the word 'gay' was used as a kind of 'swear word' (the meaning-negotiation process finished). In another case, the author of this study

heard phrase 'Uncle Hitler' from a TV programme. When he used that term for practising pur-poses while speaking to an NS, that person looked at him strangely, an attitude (related to lexis) the assumption of which the author of this study has not figured out yet (i.e. unfinished meaning-negotiation process). Having comprehension problems can draw language learners' attention to 'certain' aspects of the target language. This can lead them to request help in the form of accessing feedback, asking someone (Williams, 2001, p. 337; Smith, 2003, pp. 39-40) or looking at a re-source book. This 'meaning negotiation process' can result in comprehension, which is very likely to lead to (correctly modified) output that is more likely to be learnt (i.e. *acquisition*), as language learners have to make *more effort* to process, comprehend and produce. Thus, the learners are unlikely to forget according to the depth processing theory, which suggests that without enough effort (deep processing) information will be forgotten (Craik & Lockhart, 1972).

In sum, there is an active interplay between all phases/elements illustrated in Figure 1, where each phase/knowledge source has a two-way access to every other source in the task of analysing and interpret-ing the sensory *input* (i.e. both linguistic and non-linguistic) while using available sources and applying effective strategies to match with the input. This results in *comprehension* after the *meaning-negotiation process*, which leads to productive *output* that results in foreign language *acquisition* (in a non-target language community, SLA in a target language community). Some of these elements - words, phrases, grammatical structures and the like - are kept temporarily in short-term memory, which is limited in storage capacity and therefore can only hold a limited amount of information for a limited amount of time; while semantic cues are acquired and sustained in long-term memory. It is even like this in L1 comprehension. We, for example, do not remember words, phrasal-structures, and sentences, wholly, even partially, after a period of time, but we do mostly remember semantic representations. This is limited and subconscious, and also depends on some factors such as reviewing (i.e. effort), which is considered an effective factor in FLA/SLA according to some theories (i.e. the social learning theory, the conditioning theory; Robinson, 1989, pp. 119-130, 1991, pp. 158 - 59; Bandura, 1977; Skinner, 1953) and findings (Schmidt, 1990, p. 147).

All of these require designers and developers of interactive muldimedia environments to be more careful, as a wide range of digital elements can be combined and delivered on the same digital platform instaneously, and thus they are more likely to make the provided input unchallenging or cause cognitive overload. As a result, there are some implications of these for the design and development of interactive multimedia listening environments, which are discussed below in details.

The first implication is that listening input to be used in interactive multimedia listening environments need to be *comprehensible*. The provision of comprehensible input in interactive multimedia listening environments is also a requirement of the comprehension input hypothesis and theory, which state that language learners acquire only when they understand, and therefore "consider intake synonymous with comprehensible input"(Krashen, 1984, p. 21; Ellis, 1997, p. 47; Tschirner, 2001, p. 311). Likewise, it is also a requirement of the social learning theory, which "posits that people's judgements about their potential ability to perform well or to cope in a situation actually affect their efforts…" (Robinson, 1991, p. 157). The person perception theory, which requires us to avoid focussing language learners' attention on their weaknesses so that they do not develop negative judgements about their ability to perform (ibid: 157), and the social-psychological theory and the socio-educational model, which focus on the role of attitudes and motivation in FLA/SLA (Gardner, 1985, p. 158; Masgoret & Gardner, 2003, pp. 158-59, 124, 127) also require us to provide comprehensible listening texts in interactive multimedia listening

environments as a part of SLL/FLL. Comprehensible input can also be considered as a requirement of the cognitive load theory, which "places a primary emphasis on working memory capacity limitations as a factor in instructional design" and suggests that "too many elements of information may overwhelm working memory, decreasing the effectiveness of instruction" (Kalyuga, 2000, p. 161; Sweller, 1999). Language learners have limited processing capacity and thus proper allocation of cognitive information is critical to learning (Kalyuga, 2000, p. 161; Hedberg, Harper & Brown, 1993, p. 6; Sweller, 1999). Failure to take into account working memory considerations can cause cognitive overload particularly in interactive multimedia listening environments where many elements are combined and presented on the same digital platform. In short, input that features many unfamiliar lexis (i.e. words), syntax (i.e. grammar), accent and so on, and thus is beyond language learners' current level can cause risk of overload on language learners' limited working memory.

The second implication is that the *comprehensible linguistic input* used in interactive multimedia listening environments should be *slightly challenging*, which is -as mentioned above - also a requirement of the comprehension input hypothesis. Unchallenging input, like very difficult one, can demotivate language learners, especially autonomous learners, as they are by themselves and this might cause them to get bored and quit very easily. Moreover, *slightly challenging* input require language learners to put more *effort* and revise, which is necessary for FLA/SLA according to the depth-processing theory, which suggests that without enough effort (deep processing) input will be forgotten (Craik & Lockhart, 1972). In short, as a Kurdish Proverb says, we need to: "Plough neatly, deeply but do not hurt the oxen".

This (i.e. providing *comprehensible*, but *slightly challenging* input that requires *enough effort,* but does *not develop negative judgements*…) is what need to be achieved in interactive multimedia listening environments, where much more can be achieved better in comparison to conventional materials. In sum, interactive multimedia developers need to make sure that the provided comprehensible input is *slightly* beyond the current level of the language learners.

The third implication is that the designers and developers of interactive multimedia applications need to draw the language learners' *attention* to both syntactical (i.e. recognition) and semantic (i.e. selection/meaning) characteristics of the comprehensible input in interactive multimedia listening environments. Although comprehensible input is necessary, this alone is not sufficient for FLA/SLA. Comprehensible input, for the author of this study, does not mean the input the surface meaning (i.e. syntax) of which is understood, but also input the deeper meaning (i.e. grammar structures, culture-based meanings, the illocutionary forces/a speaker's intention) of which is understood. Drawing learners' attention to both syntactical and semantic characteristics of the comprehensible input is a requirement of the noticing hypothesis, which suggests that paying/drawing attention to (specific) forms in the input is necessary for learning new linguistic features of a language (Schmidt, 1993, 1995; Nicholas, Lightbown & Spada, 2001, p. 721; Leow, 2001, pp. 114, 144). This can be implemented effectively in particular in an interactive multimedia environment, where a wide range of digital elements can be combined and presented much more efficiently (Turel, 2015a; Turel, 2014a; Turel, 2014b; Turel, 2014c; Turel, 2012). In terms of noticing, while some claim that forms are perceived first (Tschirner, 2001, p. 312), others claim that we go 'for meaning first' (Krashen, 1984, p. 21). The author of this study personally thinks that the priority is changeable depending on language learners' level and transactional objectives. Low-level language learners might go mostly for forms first, while upper-level language learners might go mostly for meaning. In the same way, when language learners have heard a form or structure (i.e. unplanned form; Williams, 2001, p. 327) which they have been looking forward to for ages (ibid: 326), then forms are likely to be perceived first. In like manner, when language learners are interested in 'what's going

on', in this case semantic is perceived first (although the priority might even change a few times at one single exposure). Some might call it 'a personal anecdote', but, this is, at least, what has happened to the author of this study, who *has* learnt both a second language and a foreign language for ages.

Finally, in addition to providing *slightly challenging comprehensible input* in an interactive multimedia environment where language learners' *attention* is drawn to *syntactical and semantic characteristics* of the input, the designers and developers of interactive multimedia listening environments need also to provide language learners with *the opportunities to produce comprehensible (modified) output* (Ortega, 1997, p. 87). According to the comprehensible output hypothesis, in order for input to lead to full productive competence, language learners need to be given the opportunity to produce (comprehensible) output. The opportunity to produce comprehensible output further promotes noticing, contributes to language learning through 'hypothesis testing' and serves as a metalinguistic function - i.e. the opportunity to think about and analyse the -produced- forms and structures - (Shehadeh, 2002, p. 608; Tschirner, 2001, p. 311; Swain, 1985, p. 249, 1995)

Listening Skills

Listening skill is a natural and global learning skill. Language learning is normally carried out by using senses of vision, hearing/listening, speaking and the others (i.e. tasting, touching and smelling), which are called 'senses of human being' as well as reading and writing. We can, for example, require language learners to touch or hold cotton when teaching the words 'soft' or 'light'; a stone when teaching 'hard' and 'heavy' or require them to taste 'honey' when teaching 'sweet' or smell perfume/a flower while teaching 'smell', 'nice smell' or 'bad smell'. These, doubtless, have their role in the language learning process. In terms of listening, the first two senses (i.e. vision and hearing) might play more important roles in comparison to 'speaking', as listening relies on both auditory and visual input and requires the use of sight and hearing when listening to someone talking or listening texts. Of course, when the listening text is audio-lingual, the sense of sight cannot be used. Instead, imagination can be used. Likewise, the other communicative performance skills (i.e. speaking and writing) enable 'productive output' which is not only necessary for the listening process to be complete, but is also vital in the language learning process. The author of this study, for instance, once watched a TV programme in which one NS said: "I've figured out what kind of jerk I am", while he was an inpatient in the hospital during his PhD. study. He (partly) comprehended the sentence and wanted to practice the 'new' word 'jerk' as a conscious language learner, and thus he said to one of the NS inpatients: "You know, I've figured out what kind of jerk you are", the objective of which was just to practise. Although the patient got really very angry, this unfortunate productive output in the form of speaking skill helped the author of the study to learn the new word truly (although it has other meanings, as well), as it became clear that you could use that word for yourself, but not always for others whenever you want (negotiation of meaning). This simple concrete example shows the role of careful listening (i.e. more accurately the role of comprehension and paying attention to syntactical and semantic features), as well as speaking in the form of reproducing the comprehended input in the form of comprehensible (but problematic) productive output in FLA/SLA.

When someone looks at the percentage of language learners who are auditory and visual (Reid, 1987, pp. 96-97; Dunn & Dunn, 1979, pp. 238-44), the importance of listening skills in FLA/SLA becomes clearer. This means that most language learners use their senses of sight and hearing, which are most required for listening. The implication is that more emphasis on teaching/learning of listening skills in interactive multimedia listening environments might better contribute to FLA/SLA. In other words, more

and better interactive multimedia listening environments as a part of FLL/SLL need to be designed and developed both for classroom and autonomous study. In such applications, in particular in those created for autonomous study, the teaching of listening can be delivered in the form of instructions, global and local help, feedback and tasks (Turel, 2012, pp. 35-49). These are some of the possibilities that are considered for strategy training in classroom and autonomy (Hurd et al., 2001, pp. 346, 350; Kohonen, 1991, p.109; Mangiafico, 1996, p.112) and facilitators of learning (Sturtridge, 1987, p. 9).

Maybe it is because of the value and importance of listening in language learning process that before commencing to say basic meaningful words, babies listen for roughly one to one-and-half years and then begin to utter meaningful chunks. Though this is not an FLL process, there still remains invaluable facts in terms of the role listening can play in the FLL process. The question, on the other hand, is that although listening is so valuable in terms of (a) the senses devoted, (b) its frequent use in daily life, (c) its role in learning L1 and (e) FLL/SLL, it is hard to say that it is exploited appropriately. As a result, not only do language learners lack effective listening skills, as "most-learners do not come into the learning situation with the knowledge and skills to determine content and learning processes which will enable them to reach their objectives in learning another language" (Nunan, 1997, p. 201), but they do not also utilise such listening skills to learn effectively. Fortunately, the listening skill has been considered as more central in the FLL/SLL and teaching/learning process in the last two decades. It has been obvious that this skill is vitally necessary in this process and needs to be taught more overtly (Rost, 1990; Brown & Yule, 1992; Ur, 1992).

It has also been clear language learners of all abilities and levels can develop and extend their listening skills, as such skills are teachable/learnable. To this end, some researchers state language learners can improve their language performance by being trained to use beneficial strategies (Rost & Ross, 1991; O'Malley et al., 1985a; Tezza, 1962). In an experiment, the learning strategies of treatment groups, who were trained for 50 minutes daily for 8 days, improved, and they outperformed the control group (O'Malley et al., 1985b, p. 574). Rubin and Thomson (1992, p. 10) also state: "…students can be taught to control their use of listening strategies". In the same way, Cohen (1984, pp. 101-12) states that foreign language learners can use strategies that have been shown to be successful to quicken learning. Additionally, Ehrmann (1963, p. 18-20) reported that listening training improved the aural comprehension of Hebrew although some other studies partly differ from those obtained by the above researchers (Rubin & Thomson, 1992; O'Malley et al., 1985a; O'Malley et al., 1985b; Tezza, 1962, pp. 39, 46).

It appears that listening skill:

- Is a fundamental skill in the process of FLL/SLL, and relies on the senses of 'sight' and 'vision' depending on listening mode. So, when creating interactive multimedia listening software, the focus should be on both 'visuals' and 'auditory' input. In the same way, all types of listening materials (i.e. audio-only, audio + supplementary visuals, audio + animation, talking-heads video + supplementary visuals, video-only) need to, and should be provided in interactive multimedia listening environments (Turel, 2011).
- Is teachable and learnable. Teaching/learning listening skills does not end in the classroom. Thus, (autonomous) interactive multimedia listening environments should "function as a surrogate teacher" (Frankel, 1987, p. 53) as the whole point of skills development is to develop autonomy, which is the main way of life-long learning. This is the requirement of the autonomous learning theory, which "demands that learners take control of their learning" (Voller, 1997, p. 106). Improving language learners' skills and strategies, which considered "the main issue" in autonomy

(Benson, 1997, p. 19) should be the objective of the interactive multimedia listening applications. Interactive multimedia listening applications should aim to help language learners to develop their ability to learn independently (i.e. to equip them with the listening skills and techniques they need) through guiding, task involvement and encouraging them to take responsibility for their own learning and to apply affective strategies, while improving their listening.

- Listening training can help language learners to acquire strategies and use them (Hurd et al. 2001: 346; Goh, 2000, p. 73; Field, 1998, p. 117) although all levels of language learners might not benefit to the same degree. Low-level language learners can, for instance, benefit more, which means that interactive multimedia listening applications can be more effective in their training (Turel, 2012). Through tasks, language learners can, for instance, be required to use certain cognitive strategies such as 'infer missing or unfamiliar words using contexts, co-text and prior knowledge'; 'predict contents before listening using context and prior knowledge'; 'use prior knowledge to elaborate and complete interpretation'; 'take notes of content words', relate one part of the listening text to another', or 'visualise scenes' (Goh, 2000, p. 72) at different stages (Turel, 2012). Likewise, language learners can be requested to employ certain metacognitive strategies such as to 'pay attention to visuals'; 'establish purpose for listening'; 'listen selectively according to purpose' or pay attention to certain input (Goh, 2000, p. 72) or evaluate their progress (Turel, 2012). Such requirements are in line with constructivist approaches to FLL/SLL, as according to the constructivist learning theory FLL/SLL is a dynamic process where language learners are the architects, rather than the passive recipients of knowledge.

In short, listening skills are necessary and teachable, and play a role in FLL/SLL process (Rost, 1990, p. 154). These skills are not always, however, taught and acquired properly. This means that the skills are not used to the advantage of language learners fully. This might be due to many reasons such as the lack of (1) listening courses in the curriculum, (2) properly trained (listening) teachers, (3) appropriate teaching, (4) appropriate materials, or (5) due to the overcrowded classes and so on. For example, although the importance of listening in FLL/SLL was mostly first emphasised a few decades ago, in many countries listening is not practically included in the curriculum adequately yet. Likewise, many teachers are either not trained properly or do not teach as they are supposed to (TES May 21, 2004, p. 3). The teachers are not always aware of the language learners' needs or do not always care satisfactorily. Likewise, for instance, although the role of visuals in FLL/SLL is well known (Furnham et al., 2002, pp. 191-210; Ginther, 2002, pp. 133 - 67; Dodson & Schacter, 2002, pp. 782: 802; Gyselinck et al., 2002, pp. 665-85; Amrhein et al., 2002, 843-57; Al-Seghayer, 2001, p. 203; Secules et al., 1992, pp. 480 - 90), they are not used enough by teachers as well as in interactive multimedia applications. The author of this study was shocked when he realised the big gap between the implications of findings in the field of FLL/SLL and CALL, and what really often goes on in classrooms. Learning materials, whether they are conventional or interactive multimedia, are also not always convenient (Turel, 2014). In one case, the language learning materials were mostly about robbery, burglary, and stealing. The author of this study felt as if he were attending a 'robbery course'. When he had private conversations with some other language learners who were attending the same pre-sessional course, he realised that they felt the same, but nobody felt safe enough to tell their opinion. This is often the case in our civilised (!) world particularly in a century when flattering is favoured most and people dare not often to tell their honest opinion (TES April 30, 2004, p. 1) although the benefits of truth extends far beyond individuals and the century we live in, and its contribution to humanity, as a whole, is tremendous and invaluable.

Interactive Multimedia

Nowadays, when one speaks of 'multimedia' mostly one thing comes to mind. It is the use of sound, video, text, pictures, graphics and so forth on the same computer platform, which are totally computerised and therefore under computer as well as learner control (Turel, 2015a, pp. 2495-96). It is also well known that multimedia also refers to the use of different tools, not one, such as television, the tape recorder, video, the OHP, slide projector, and the like (Ashworth, 1996, p. 81). This is now "referred as multiple media to differentiate it from computerised multimedia" (Peter, 1994, p. 10).

Turel (2014a, p. 167) defines multimedia as a design, combination and delivery of a wide range of digital elements on the same digital platform which "provides a multidimensional, multi-sensory environment in which rich, efficient, instant, comprehensible, optimum and meaningful input and feedback can be presented" to the learners of all subjects at all stages of learning (Figure 3). CCED defines multimedia as: '… programs which involve the use of sound, pictures, and film, as well as ordinary text, to convey information' (see Brett, 1998, p. 81; the Dictionary of Multimedia, 1997, p. 151; Ashworth, 1996, p. 81; Thierry, 1996, p. 7 for further definitions). It appears that multimedia is a powerful tool, as it enables materials developers to combine and deliver different digital elements on the same computer platform in very beneficial and meaningful ways. None of the conventional tools has such a power. When links between elements are provided, then it is called interactive multimedia as well as hypermedia (Turel, 2015a, p. 2496), otherwise it is called multimedia. These links can be in the form of hyperlinks, hypertext, buttons, hotspots or hotwords so that a user can retrieve information and/or navigate. In other words, certain words or units link to other documents or move a user to another position in the application or display information pertinent to the particular link on the current position. This information can be in the form of sound, text, picture, graphics, video and so on, or optimum combinations. When interactive multimedia/hypermedia "enables learners to make preferences, record them, their individual needs and learning goals, and then uses them throughout interaction with the learners in order to meet their personal needs so that they can learn better, then hypermedia becomes adaptive hypermedia …" (Turel, 2015a, p. 2497), which is relatively a new direction in the field (Brusilovsky, 2012, p. 46) and consists of different models (Kahraman, Sagiroglu & Colak, 2013, p. 60).

Figure 3. Combination and delivery of a wide range of digital elements on the same digital platform
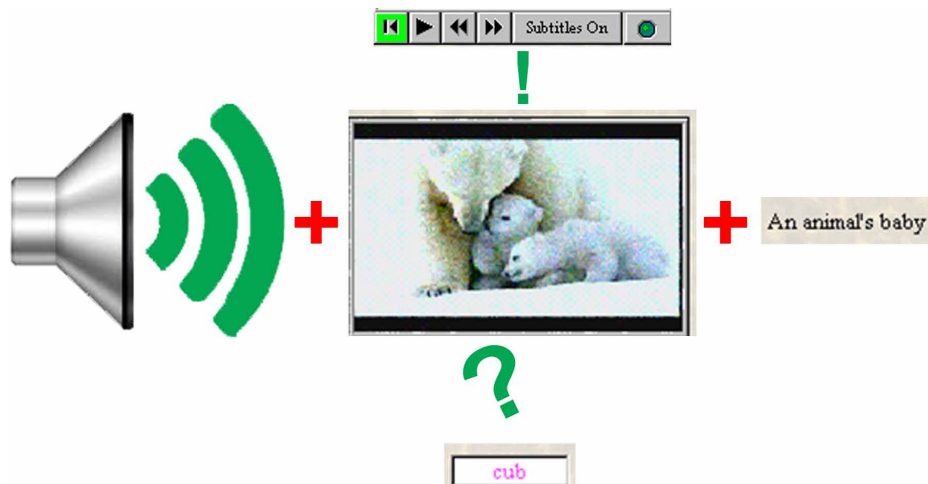
Interactive Multimedia in FLL/SLL

In terms of FLL/SLL and teaching, there are some outstanding differences between interactive multimedia applications and conventional materials. These differences are: (a) the combination and delivery of a wide range of different digital elements on the same digital platform, which cannot be provided with any other media. (b) Multimedia applications are navigational and interactive. (c) Language learners have better control over interactive multimedia applications. (d) It is easier for language learners to use interactive multimedia applications, as 'everything' is on the same platform as well as instantaneous due to the presence of hyperlinks in the form of hotspots, hypertext and buttons. In the same way, interactive multimedia language applications have many different combined elements, which can make (a) input more easily comprehensible and (b) learning enjoyable, all of which can result in FLL/SLL better (Turel, 2015a; Turel, 2014e, pp. 292-309; Stevens, 1995, pp. 289-99; Stepp-Greany, 2002, p. 172). For instance, in Soboleva and Tronenko's (2002, p. 495) study, language learners appreciated different aspects of CALL, whether it is delivered on the Web or on CD-ROM format, and they found it interesting, rich, simulative, helpful, interactive and so on. These results are also supported by other studies (e.g. Turel, 2014a). In Borras and Lafayette's (1994, p. 67) study, the majority preferred the computer laboratory to the language laboratory. The positive attitudes towards interactive multimedia are also agreed on by language teachers in that they think, "the use of computers would motivate the student to study (81.47 - 0%) …" (Carbola-Calero, 2001, p. 11). The results of other conducted investigations revealed that language learners remembered better from the interactive multimedia treatment then the traditional treatment (Crosby, Stelovsky & Ashworth, 1994, pp. 3-13). A study by Brett (1997, pp. 39-53) also reports that language learners' success rate while using interactive multimedia is greater than traditional ones (ibid: 45-6). A research study by Deville, Kelly, Paulussen, Vandecasteele & Zimmer (1996, p. 81), which was conducted on a group of beginner language learners who accessed interactive multimedia listening software, revealed that language learners generally performed better in listening comprehension. Likewise, interactive multimedia is also effective for other skills (i.e. writing, reading, teaching of grammar and culture) (Soboleva & Tronenko, 2002, p. 494; Adair-Hauck, Willingham-McLain & Youngs, 1999, p. 294) although speaking was "… clearly beyond computers' working possibilities" a decade ago (Fleta et al., 1999, p. 55). It is now feasible even to integrate oral responding tasks in listening tasks with the maturity of natural language processing technology. The TOEFL integrated listening and speaking tasks are, for example, good examples although they are currently only used for assessment purposes (Xi, 2010, pp. 291-300).

Since FLL/SLL is a multi-channel phenomenon, the combination of different elements provides a multidimensional, multi-sensory and interactive environment in which language can be presented in different ways (Turel, 2011). This can meet the needs of different individual learners who have different learning style preferences (Carson & Longhini, 2002, p. 408; McLoughlin, 1999, pp. 222-23; Brickell, 1993, p. 103), although in terms of listening skills only two of the sensory channels- visual and acoustic - are especially privileged. For instance, while the provision of audio-only meets the needs of auditory learners (Ridgway, 2000, p.182), video can meet the needs of visual learners (Adair-Hauck et al. 1999, p. 289; Peter, 1994, p. 202; Hart, 1992, p. 5; Tschirner, 2001, p. 310). Likewise, functional interactivity facilitates the negotiation of meaning, which is necessary in FLL/SLL, as learners can access hyperlinks, glossaries, feedback, captions, and so on immediately, and find out what and why they have not understood, and the underlying assumptions (Turel, 2015a). All these facilitate listening comprehension,

draw learners' attention to 'their weaknesses' and certain aspects (i.e. syntactical and sematic features) of input (Nicholas et al., 2001, p. 721; Leow, 2001, pp. 114, 144; Schmidt, 1993, 1995) and result in depth processing (Craik & Lockhart, 1972), all of which are necessary conditions for FLL/SLL.

The combination of different elements through links on the same platform provides navigational and functional interactivity and multi-dimensional and sensory support (Herron, Dubreil, Corrie & Cole, 2002, p. 37; Leffa, 1992, p. 66). For instance, when learners need to, they can access instant dictionaries, grammar structures, captions, feedback and the like, which are combined and on the same platform, or relisten to listening texts without losing time, all of which are good opportunities to exercise control over FLL information (Tschimer, 2001, pp. 312-13; Brickell, 1993, p. 103). These aspects of interactive multimedia can enable learners to find out the difficulties, the right solutions, what the rules are; to analyse the mistakes that have been made; and to find out why they have made such mistakes by assessing their answers, recording and scoring them, pointing out and explaining mistakes. This capability provides more real-world learning contexts and more authentic and interactive tasks (Turel, 2015a).

Interactive multimedia environments provide learners with the opportunity to learn FL/SL at their own pace, without fear of making mistakes in the presence of a teacher or other learners. It is a tension free environment in which learners can use computers individually, as learners have no teachers and friends present. In particular, during self-study it is a private and flexible workplace where learners can take risks; work in their own place (Tschirner, 2001, p. 307), in their own time, at the pace they need, and in the way they enjoy because it gives them the control (Soboleva & Tronenko, 2002, p. 493; Trinder, 2002, p. 75), provides them with different choices, tasks and feedback. In other words, it enables learners to decide what to study, when to study, how to study, how long to study, how often to study, and even where to study in a considerably easier invironment, as wide range of elements are on the same platform and everything is simultaneous. These can make learners feel more comfortable and might result in promoting development of self-confidence and provoking working hard. It is due to these reasons that learners do not complain about the fear of making mistakes (Deville et al., 1996, p. 83). Conversely, learners express their comfort of working with interactive multimedia (Trinder, 2002, p. 75; Fleta et al., 1999, p. 55; Brett, 1997, pp. 46-7; Peter, 1994, pp. 157-58; Hoven, 1999, p. 91).

Since interactive multimedia offers learners many choices (i.e. sound sequences, video clips, video/sound clips with optional captions, vocabulary and grammar links, pertinent comprehension tests with immediate, remedial and innovative feedback, instructions, visuals and the like), it is highly motivating. When learners make mistakes, this does not even de-motivate them because they have the opportunity to receive instant and meaningful feedback, and practise as many times as they want to, and need to (Soboleva & Tronenko, 2002, p. 483; Ayres, 2002, pp. 247-48; Lyall & NcNamara, 2000, p. 9). This is an important factor in FLL/SLL especially during autonomous study because "how to engage the interest of the learner and so sustain his motivation to learn" is considered "a related problem for the writer of self-study materials" (Frankel, 1987, p. 53). Most importantly, not only is motivation "directly linked to achievement" according to the socioeducational model (Masgoret & Gardner, 2003, p. 129), which suggests that integrativeness and attitudes toward the learning situation cause learners' motivation to learn an FL/SL and motivation is responsible for achievement (Masgoret & Gardner, 2003, p. 124; Gardner, 1985, p. 158), but motivation is also common to all models of FLL/SLL (i.e. the acculturation model, the conscious reinforcement model, the intergroup model, the interactionist SLA model, the LMR-plus Model, the monitor model, the social context model, the social psychological model, the elaboration Theory model – Gardner, 1985, pp. 142, 125-66).

Technically, pedagogically and psychologically, it is easier for the designers and developers of interactive multimedia to combine and deliver different elements on the same platform more effectively in interactive multimedia environments. For instance, interactive multimedia (i.e. computer based educational technology) provides a non-linear editing facility. Thus, materials writers can cut and move digitised audio/video in any order (Tschirner, 2001, p. 307). Moreover, computer sound has more advantages in comparison to tape-cassettes for learners. These are: "(1) The option of instantly accessing sound in non-linear form, (2) The facilities of stepping and isolating, (3) Instant record, replay and comparison, (4) The ability to synchronise text and graphics" (Willets, 1988, p. 4).

Being able to feature in, combine and deliver different elements on the same platform, interactive multimedia can guide learners more effectively. For example, when learners make a mistake, they receive instant and meaningful feedback (Turel, 2012, pp. 35-49). This can enable them to find out why they have made the particular mistakes, how they can overcome such difficulties in future occasions, and improve new strategies. Due to these reasons, interactive multimedi is considered efficient for self-study use (Soboleva & Tronenko, 2002, p. 483; Brett, 1996, p. 206). Additionally, if learners are instructed about which strategies they need to follow in which situations, then they can be directed and guided (Turel, 2012; Debski & Gruba, 1999, pp. 219-20; Barnett, 1993, p. 303). This is important because learners can be taught to "use appropriate comprehension strategies" (Goh, 2000, p. 71), which is mostly needed during self-study, as learners are by themselves (Debski & Gruba, 1999, p. 219-20).

Interactive multimedi can prepare learners more effectively and adequately for listening input. The assumptions are that, for instance, interactive multimedi empowers the designers and developers of listening materials to (1) provide learners with different elements such as unknown items, grammatical rules, special features of text type, short audio messages, short video clips, sample sentences, graphics, animations, visuals, simplified written versions of the text, information about the speakers, their roles, how they interact, the content and so on at the pre-listening stage, which can not only be implemented in different and efficient ways, but also prepares learners very well to the while-listening stage (Turel, 2015b).

Interactive multimedi can qualify learners to overcome potential sources of difficulties of listening input such as unfamiliar items, proper names, cultural difficulties, grammar structures, fast speech, and unfamiliar accents (Turel & McKenna, 2015; Turel, 2014c; Turel & Kilic, 2014). The meanings of unfamiliar items can be provided through hypertext, hotspot or other links such as dictionaries. These can be explained in target language through synonyms or antonyms (Turel & McKenna, 2015). Likewise, learners' attention can be drawn to cognates, false cognates and polysemous words, which are useful for vocabulary acquisition and helpful for understanding, and improving listening as well as the other skills (Vidal, 2003, p. 80, Hammer & Monod, 1978, p. 32; Nakic, 1981, pp. 11-12), at the pre-listening stage. Additionally, simple sentences and short paragraphs featuring unknown items can be provided. In some cases, the unfamiliar items can be explained throughout visuals, audio or video clips. Their equivalents in L1 can be given if LLs are monolingual or if we know the L1 of the target customers. Unfamiliar proper names can also be given in advance so that learners will not have difficulty. Such names can be given through pictures and cartoons that have labels and instructions. Cultural differences and unknown grammar structures can be explained and illustrated through simple samples, pictures, audio or video clips. The assumptions behind cultural differences, for instance, can be elucidated and presented in different ways (Turel & McKenna, 2015; Turel, 2014d, pp. 268-293; Turel & Kilic, 2014, pp. 245-267).

Fast-speech and unfamiliar accents can be overcome in interactive multimedi in different ways: (1) They can be overcome by providing captions, as they make fast speech comprehensible (Turel, 2015c). (2) Fast speech can be overcome by giving learners the control of speech-rate or alternatively by providing slow versions in addition to the authentic versions (Turel & McKenna, 2015). Captions can also help learners to come to grips with proper names (Turel, 2015c). Not only do these help learners to overcome the difficulties, but they also help learners comprehend, gain confidence, and prepare for future occasions, which are very beneficial (Fox, Romano-Hvid & Sheffield, 1992, p. 48; Deville et al., 1996, p. 82).

In conventional materials, feedback is normally given in learner's books or answer key books. When learners have difficulty, they can access them. Although this is useful, feedback in conventional materials is very limited, as (a) it is not instant and (b) it consists of restricted elements such as text, pictures and graphics. In interactive multimedia, feedback is (a) immediate, (b) can consist of different elements (i.e. audio, video, visuals, text, animation or optimum combinations) which meet both learners' visual and acoustic needs resulting in FLA/SLA and (c) can be conditional (Turel, 2012, pp. 35-49). Such feedback can help learners to (a) find out what and why they could not understand and (b) overcome the difficulties causing them not to comprehend, which facilitates meaning negotiation, draws attention and raises conscious/metacognitive awareness. This can guide and lead learners to develop new and effective strategies, which is one of the targets that material writers want to, and need to, fulfil especially in autonomous materials (ibid: 35-49). To this end, a famous Kurdish scholar, Kahlil Gibran, in his book entitled 'The Prophet'; has a poem, the part of which runs thus: "Then said the teacher: 'Speak to us of teaching.' ... 'If he is indeed wise, he does not bid you enter the house of his wisdom, but rather leads you to the threshold of of your own mind".

Learners do not have the same background and abilities. While some have high abilities and know quite a lot about target language and target culture, others may not. As interactive multimedi enables materials writers to make use of different elements which can make input comprehensible and create gradual and different tasks, each individual can find what is most appropriate for them or a way of working which is most convenient for them. For instance, learners with high proficiency can prefer to listen to listening input without captions, while those with low proficiency can listen to with captions. In the same way, if learners find speech rate too fast, then they can slow down or alternatively prefer the slow versions. Of course, we do not mean that every individual benefits from such applications to the same degree. It is a fact that all learners' attitudes towards FLL/SLL and using computers for FLL purposes are not the same. Thus, logically and apparently different learners will benefit in different degrees.

Interactive multimedi can be used for classroom use and individual use (Soboleva & Tronenko, 2002; Gillespie & McKee, 1999), as it has much to offer. The results of research by Mangiafico (1996, p. 106) suggest that the use of the same program for both classroom use and individual use can be equally beneficial in enhancing students' FLL/SLL listening comprehension. Although the author of this study thinks and believes that interactive multimedia is beneficial for both classroom and individual use, he believes that it can be more helpful for individual-use (depending on the nature of interactive multimedi applications).

On the other hand, the power of interactive multimedia (i.e. combination of a wide range of learning features on the same platform) require the designers and developers of interactive multimedia environments to consider the requirements of the dual coding theory and the generative theory of multimedia, which suggest that presenting two concurrent elements to teach one element is effective, as it helps guide learners' cognitive processes (Moreno & Mayer, 2002; Al-Seghayer, 2001, p. 226; Mayer, 1997; Chun & Plass, 1996, p. 515; Mayer & Sims, 1994; Mayer & Anderson, 1992; Wittrock, 1990; Paivio, 1986)

although this is not always the case (Amrhein et al., 2002, pp. 843-57; Kalyuga, 2000, pp. 2-3). In the same way, this aspect of interactive multimedia also requires the designers and developers of interactive multimedia to consider the requirements of the cognitive load theory. All these show how it is essential to design every element of interactive multimedia listening environments efficiently (i.e. optimum combinations or 'right balance') (see Figure 4 for optimum combinations).

To sum up, interactive multimedia provides an invaluable environment that enables the designers and developers of listening applications to overcome listening difficulties and provide conditions that facilitate listening comprehension as a part of FLL/SLL. These can make an undeniable contribution to listening skill development as a part of the FLL/SLL process.

The Limitations of Interactive Multimedia in Teaching Listening

Although computer based educational technology was not so not perfect a decade ago (i.e. the quality of video clips, for instance, would diminishe when they were compressed; Soboleva & Tronenko 2002, pp. 488, 496), since then technological developments in the field of educational technology has occured very rapidly. As a result, nowadays very high quality and efficient computer technogoy is available, which fortunately can currently enable us, materials designers and developers, to have technologically very highly sophisticated qualities.

The main problem is not the technological dimension any more; at least the author of this study thinks so. Currently, there are many interactive multimedia applications on the market that are not entirely sophisticated pedagogically and psychologically (Turel, 2014a, pp. 167-183; Ferney & Waller, 2001, p.

Figure 4. Optimum design of different digital elements on the same digital platform
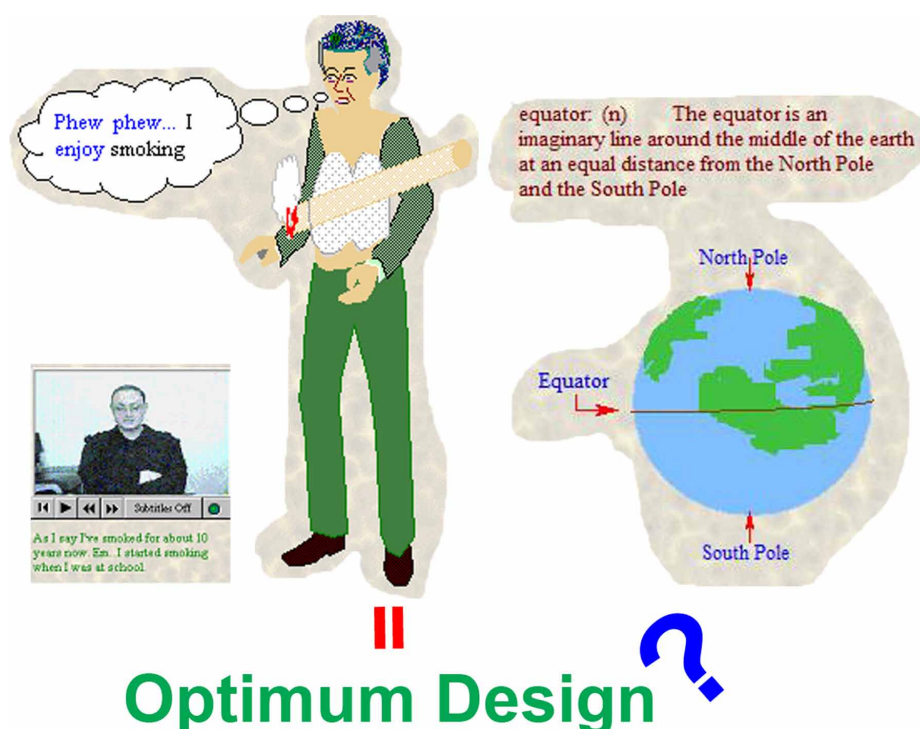
156; Trinder, 2002, pp. 69-84). Such applications were even called 'shovelware' in the past (Clifford, 1998, pp. 2-8), as was the case more than two decades ago (Le Mon, 1988, p. 39). Some even featured spelling errors although they were written by NSs (TES Teacher 2004, p. 18). The problems fundamentally stem from materials writers, not the technology itself, as in many cases many materials writers are not expert either technically or educationally. Only a team that consists of both pertinent educators and technologists can create both technically and pedagogically very sophisticated and ideal interactive multimedia listening applications. If technically and pedagogically sophisticated interactive multimedia applications on the market are surveyed carefully, it will be seen that they have been created by teams made up of educators and technologists, not either. This is the case for many interactive multimedia projects, as well (Phillips, Pospisil & Richardson, 2001, pp. 96-114; Grob & Wolf, 2001, p. 234). To be able to create in real sense cost-effective/professionally sophisticated intearcative multimedia applications, the active participation of all experts needed (depending on the type of the application we want to create) is a must such as instructional designers, (specialist) teachers, programmers, graphic designers, audio engineers, photographers, artists, voice actors, film directors/specialists, musicians, animators, (target) learners and so on (Turel & McKenna, 2013, pp. 188–209). All truly professional works are always achieved by a team of pertinent experts, not by single individual, "where one person acts as a curriculum expert, content expert, programmer and instructional designer" (Hedberg et al., 1993, p. 4). The involvement of such experts is vital and has to be in true sense (Nicholson & Ngai, 1996, p. 3). Target learners' involvement, for instance, "produces more useable and effective" interactive multimedia applications (Nikolova, 2002, p.112; Kennedy & McNaught, 1997, p. 6; MacGregor, 1993, p. 3; Eraut, 1988), although the findings in the field of interactive multimedia materials and CALL are very often learners' preferences, views, ideas, progress etc. Equally, the lack of a specialist programmer hinders not only the use of the maximum potential of the computer tools, but also results in lack of the minimum requirements (Grob & Wolff, 2001, p. 249; Lyall & McNamara, 2000, p. 8). The involvement of these experts needs to be in true sense. In the past, there were even some interactive multimedia programmes that created by experts, but were developed "with minimal reference to the educational research available, both within a particular discipline and about student learning in general" (Kennedy & McNaught, 1997, p. 1). Interactive multimedia applications also need to be evaluated, which happens while creating (i.e. formative evaluation) and after (i.e. summative evaluation), and revised accordingly (Colpaert, 2002, p. 439; Phillips et al., 2001, p. 5; Sims, 2000, p. 4; Adair-Hauck et al., 1999, p. 274). In other words, the stages of interactive multimedia software design and development are categorized into six separate stages (i.e. feasibility, setting up a team of experts, designing, programming, testing, and evaluating) and at each stage a wide range of principles and guidelines need to be borne in mind so that cost effective interactive multimedia language listening environments can be designed and developed (Turel & McKenna, 2013, pp. 188–209).

In conclusion, nowadays, it is the limitations of interactive multimedia designers and developers that are the problem in the development of interactive multimedia applications rather than the limitations of the computer based educational technology. This unique compiled book will further enable all linguistic and computer based education scholars, students, institutions; software companies and teams of software developers not only to better understand efficient and effective interactive multimedia software design and development principles and guidelines, but also will empower them to design and create efficient and cost effective multimedia listening software for any language as a part of FLL/SLL.

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