

Games and foreign language teaching

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Active spoken mastery of a foreign language all too often remains an illusive wish on the part of language learners. There is a tendency to seek the causes of non-fluency and accurate speech outside the classroom, for example, too little involvement, interest and time investment on the part of learners. In this article Manuela Macedonia asserts that the problem is attributed primarily to the type of exercises that are employed to process foreign language input. Traditional transmission of morphology and syntax by way of rules, and practising such rules via written exercises, does not lead to spoken language, for with this type of practice the retrieval of learned material is too slow and often incomplete to enable successful speech. While games in language and SEN instruction are not new, in this article their targeted usage based on cognitive/neurological evidence is proposed in order to proceduralise declarative knowledge and thereby to elevate accuracy and fluency to a level that enables real-time speech.

Key words: foreign language teaching, mastery, games, declarative knowledge, procedural knowledge.

Introduction

The language learning landscape in continental Europe over the past two decades reveals that the path to active mastery of a foreign language is long and rocky. Somewhere along the line, learned grammar and vocabulary should merge into sentences and so empower language learners to speak. Such merging should occur at a tempo that matches native speakers in order to enable communication and to avoid a loss of interest or a switch to another language on the part of the communication partner. A typical negative example is a waiter in a foreign country who lacks the time and patience to give the tourist's laborious language production a chance and so responds in English.

Foreign language should be available as a retrievable inventory of useful resources in the memory of learners to enable them to communicate in real time; only then have they achieved fluency in the foreign language. Understanding a language, knowing its rules and retrieving vocabulary amounts to progress toward fluency, but cannot be equated to active fluency. This sounds banal and self-evident. However, in practice we observe that learners accrue much metaknowledge about the language, yet even after years of study cannot speak fluently. Why does conventional language instruction attempt to transmit foreign language as theoretical knowledge, and why does practical application remain so difficult? Certainly there are multiple answers to these questions, for example, that grammar is essential and forms the structural basis for a certain level of accuracy in language production.

However, we can seek different kinds of answers in the reality of unsatisfactory achievement: learners fail to recall vocabulary, sentence formation takes too long, learners are uncertain about word endings, etc. All this leads to inhibitions rather than to speaking! But why is vocabulary not available for retrieval? Why does it take so long to form a sentence? Why are learners uncertain about word endings? And how are these interrelated? Consider native speakers. They speak effortlessly, yet possess theoretical knowledge of their language only if they study such in school. A native speaker does not simply inherently know about grammar, that a word happens to be a verb, or which morphological forms this verb has. The native speaker retrieves every word and structure instantaneously and so can communicate in real time.

While my experience over the last 15 years has been rooted in foreign language education in schools, universities and adult education, games could likewise prove a viable instrument in the instruction of pupils with special educational needs. Certainly SEN educators have already paved new ground far beyond conventional pedagogy, and games are nothing new in this field. However, I propose the concept of games as tools for the targeted proceduralisation of declarative knowledge (see below). I invite educators to develop appropriate games for the specific needs of learners with SEN, as modern neuroscientific research indicates that proceduralisation functions in the same way for all learners (see Gazzaniga, Ivry and Mangun, 2002).

The proceduralisation of declarative knowledge applies to many areas of learning beyond foreign language (see Anderson, 1996). However, I know of no comparable research on the targeted use of games in fields other than language learning.

Declarative memory versus procedural memory

If language knowledge is retrievable, then this means that it has been stored. The better it is stored, the easier is the retrieval. Where is language information stored? First, let us update our understanding of the term *memory*. Contrary to what science previously believed, memory is not located at specific coordinates (compare computer memory), but results from the interconnection of neurons in all parts of the brain. When information enters the brain via peripheral organs (eyes, ears, etc.), neurons are stimulated and develop dendrites, at the end of which are synapses. Neurons combine to form neural networks in which stored information is located. We can term a learning process successful if such neural networks form, and are stable enough to make the stored knowledge retrievable. Now, for the brain, information is not information. For example, we might remember facts, a birthday, an accident, or how to drive a car.

The brain orders information according to type and provides two memory systems, declarative and procedural memory: ‘Declarative ... memory is responsible for conscious recall of facts and events (declarative knowledge)’ (Birbaumer and Schmidt, 1996, p. 567); ‘Procedural ... memory involves the learning of a variety of motor skills (for example, knowledge of how to ride a bike) and cognitive skills (for example, the acquisition of reading skills) ...’ (procedural knowledge) (Gazzaniga et al., 2002, p. 3159). When we learn to drive a car, we first receive theoretical instruction; this knowledge is stored in declarative memory. Theoretical knowledge is then translated into practice and we practice until we are able to drive without consciously thinking about it – we simply do it.

What does this have to do with language learning? It raises the question of whether foreign language production involves declarative or procedural knowledge.

Foreign language production: declarative or procedural knowledge?

Native speakers speak without consciously thinking about sentence construction and vocabulary. In the process of native language acquisition, they never learned to conjugate a verb and yet they tend to use the correct verb form. For this and other reasons, many language and cognitive scientists assert, and provide evidence, that language is procedural knowledge (see, for example, Johnson, 1996). If a person wants to speak in real time, it is impossible to apply all rules on a conscious level. The rule system must function automatically in a procedural sense. Yet consider how foreign languages are taught in conventional continental

European instruction: as procedural or as declarative knowledge? Here, conventional instruction means the transmission of the target language via audiovisual stimulation such as recordings, books, overheads. The declared goals are, generally, equally important mastery of four abilities – listening comprehension, reading comprehension, written production, oral production – whereby they are ascribed methodologically equal importance. Instruction time is restricted to one and a half or three hours per week and extends over a long time period – three or more years. The general approach, independently of the methods, is rooted in Chomsky’s Universal Grammar and Language Acquisition Device (see Buttaroni, 1997; Cook, 1993).

Despite a variety of didactic approaches and methods (Ellis, 1997), rules remain a part of language instruction. When students learn the rules for forming questions in English using the verb ‘to do’, for example, and store such, for example, ‘Do you like English grammar?’, they apply declarative memory, so it is declarative knowledge. However, if they apply these rules in a way that means they no longer think about them and produce correct questions in English, they employ procedural memory and their knowledge is procedural. ‘The proceduralisation of linguistic knowledge is the most important factor in the development of fluency in ... second language learners ...’ (Towell, Hawkins and Bazergui, 1996, p. 84). Foreign language is generally taught in a declarative way: rules for morphological and syntactic structures and lists of (disjoint) vocabulary are the crux of instruction. This is our tradition, for this is how Latin and classical Greek were taught; however, for ancient languages it sufficed to be able to read texts and to translate them.

Modern foreign language instruction has different goals: Students need to transform declarative knowledge into procedural memory in order to be able to produce spoken language from rules and vocabulary. But how do we proceduralise declarative knowledge?

Proceduralisation is a product of practising – not only for languages. Once learners have posed a question with ‘to do’ 500 rather than 50 times, at some point it becomes automatic and they no longer think about the rule (Johnson, 1996). At this point the rule has been proceduralised. ‘The executive principles specify the particular stages in the grammar-teaching sequence and can be described as follows:

- the first stage should emphasise the noticing of the target structure and the establishing of the form–meaning relationship
- the second stage should involve the proceduralisation of relevant declarative knowledge through various types of production practice.’

(Marton, 2003, p. 1)

Proceduralisation of declarative knowledge can be observed in learning to play a musical instrument. In conventional piano instruction, first declarative knowledge is transmitted: where the notes are on the keyboard, their

names, the meanings of symbols for reading music. This is the grammar of piano playing. Step by step, procedure accompanies theory: playing the instrument. Thus theory and practice evolve in parallel, so that music students not only know but also master the language of music. Clearly the goal is not to talk about notes but to play them and thus make music. This idea resonates with language learners, who do not want to recite the rules of a foreign language, but to produce living language from words and rules.

Not every exercise is good exercise

If practice is the means for proceduralisation of theoretical knowledge, why do conventional exercises not function as we would like them to? Why do they not achieve the desired result of making learners into real-time speakers?

To answer this question, we first need to note that the brain can only (re)produce what it has learned. If its task is to fill in blanks with verb endings, it will be able to handle the task. However, this does not imply that it will be able to attach correct verb endings on demand in real time at speech tempo. In other words, if driver education students have completed theoretical instruction, this does not necessarily mean that they can drive a car. Thus, if language learners have learned to fill in written exercises, this does not necessarily mean that they can transfer this ability onto speech production. We do not contest that both cases concern language, rules and application. However, language learners want to speak rather than only write!

Knowing that the written exercises in course books do not produce the targeted results, how do we achieve the transition between theoretical knowledge about language (declarative knowledge) and practical knowledge – the active mastery of a foreign language (procedural knowledge)? The goal remains to be able to speak a foreign language in real time. Naturally we do not want to forsake rules and structures, because for multiple reasons learning a foreign language is not the same as learning a native language (Pinker, 1994).

Let us emphasise again that the proceduralisation of spoken language can occur only via the modality of speaking and not via writing. Any human activity that is to be reproduced can be learned only if it is perceived and practised as such. We cannot learn to drive an automobile by attending theoretical instruction and then riding a bicycle. In order to proceduralise declarative knowledge of English so as to be able to communicate orally, learners absolutely require frequent speaking rather than written or auditory exercises. However, the circumstances that accompany language learning are difficult and encumber speaking practice:

- in the phase where students learn question formation with 'to do', they are not yet able to speak enough to apply these structures correctly
- likewise, we cannot require that students repeatedly reside in a foreign language-speaking country in order to proceduralise the declaratively acquired structures.

How effective are conventional exercises in course books? The last two decades in didactics have made listening comprehension exercises the standard in instruction. This development was necessary to ensure that language learners have input from native speakers via recordings and train their ear to decode spoken language. However, this is not equivalent to active speech. Another type of exercise, written exercise, has been the subject of various trends in foreign language didactics. Thirty years ago course books were full of drill patterns. They went out of fashion and made way for other types of exercises. They were frequently replaced by elaborative processing of texts, fill-in-the-blanks, summaries, and text production. At some point they re-emerged, although hidden, unnoticed and no longer under the old name. More language course books were redesigned with a wealth of texts and a paucity of exercises. They strived to supply language learners with lots of language input so that they could tap this wealth as with real language. Instruction focused on communication, while accuracy of structure moved into the background. Actually, it was necessary to redefine the focus in order to make foreign language into a communication code rather than an object of metaknowledge study.

However, a language learner who experiences uncertainty in morphological and syntactic structure hesitates in the production of sentences and loses time. And if the learner does not distinguish between first and third person of a verb, then the well-intended communication becomes burdensome because important semantics are lost. While at some point it became clear that grammar exercises are necessary to achieve an essential degree of accuracy through proceduralisation, for whatever reason, they are only sparsely represented in course books. From my viewpoint (also as an author of course books), the reasons vary: the publisher imposes a page restriction per chapter; an exercise falls victim to an illustration; the purpose is variety in the exercise modality instead of necessary repetition, etc. So, if proceduralisation of declarative knowledge (grammar rules) cannot be achieved through either written or auditory exercises because insufficient repetition takes place and the modality is not that which is to be practised (speech) – indeed, instructors also lack the time to practice the structures orally often enough with each student – how then should it take place in a realistic form that is practicable in instruction?

A game example from my classroom practice

The following game sequence targets the proceduralisation of Italian reflexive verb conjugation. The difficulty for German-speaking learners is to find the correct sequence of the morphology elements necessary to produce an accurate conjugation in Italian. The infinitive given in the dictionary has to be decomposed and recomposed. For instance, the Italian verb *svegliarsi* (to wake up) is reflexive, whereas the German equivalent is not. The Italian conjugation works as follows:

io mi sveglio (I wake up, literally I wake myself up)
tu ti svegli (you wake up, literally you wake yourself up)
and so on.

Language learners consider the rule to be easy; nevertheless they find it difficult to assimilate and apply accurately. Therefore I developed the following game sequence.

1. Game 1, wooden blocks

Goal: recomposition of the conjugation

Learners are provided with various wooden blocks labelled with verb stems, endings, and reflexive pronouns. They toss a die to determine the person and then assemble the remaining elements, as shown in picture 1.



Picture 1

2. Game 2, cards

Goal: acceleration of recomposition procedure

After the learners have been sensitised regarding the elements for conjugation, an improvement in speed is necessary. A card game (picture 2) employs a die and verbs in the infinitive to repeat the procedure as often as possible.



Picture 2

3. Game 3, finger game

Goal: enhanced acceleration with different partners

Learners move freely in the room and meet to play a finger game. Each of two players counts to three and on three extends 0 to 3 fingers. The sum of the two players' extended fingers corresponds to the person in the conjugation (where 4 to 6 are the plurals). See picture 3.

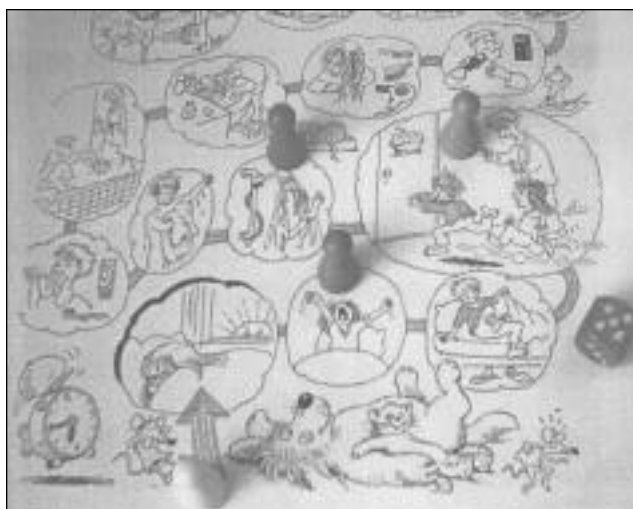


Picture 3

4. Game 4, board game

Goal: Further proceduralization

Positions on the game board require application of the knowledge acquired in games 1 to 3 (picture 4).



Picture 4

Language games

The goal of the above game sequence is the proceduralisation of reflexive conjugation. Proceduralisation occurs only via very frequent repetitions, and it cannot be achieved effectively with conventional exercises. The high amount of repetition achieved via the game approach surpasses by far anything that can be achieved with written exercises. Furthermore, the repetition is oral in nature. What is more, students have fun while playing.

In my search to find out what works, early in the 1990s, I discovered games in foreign languages. I began with verb morphology with cards and dice and composed materials of all kinds for that purpose. My teaching used games only for grammar, and winners always received a reward. Losers were encouraged to try their luck at the game again. Losing was consciously associated not only with not-yet-memorised foreign language but also with luck. Admittedly, at that time I was not sure whether the games contributed more to

processing declarative information or to entertaining course participants. However, I observed that students enjoyed playing with cards, dice, equipment and movement games and that they thereby practised lexical, morphological and syntactical elements. I observed that the work with structure increased attentiveness compared to written exercises and that peer pressure proved more effective than grades on written exercises.

Nowadays I know that, to be effective, language games are not to be employed in teaching as play in a conventional sense, to provide entertainment: they are employed in a targeted way in order to proceduralise foreign language. Their entertainment aspect is a positive side effect, an advantage over written exercises. Whether we are talking about card games or movement games (Macedonia-Oleinek, 1999a; 1999b; Macedonia, 2000; 2004), language learners repeat the assignment very frequently to achieve the game's goals. This produces redundant oral practice for all game participants. Thereby a verb ending might be used orally fifty or one hundred times rather than ten times and so repeated, heard and possibly corrected within the group. This procedure is employed repeatedly until students perform automatically without thinking consciously about verb endings. 'Automatisation may be seen as the process of converting declarative knowledge into procedural knowledge, bringing with it all the advantages of the procedural, and eliminating all the disadvantages of the declarative ...' (Johnson, 1996, p. 90). In the course of the game, the frequency of practice also increases the speed of performance. Forms that occur frequently are suddenly seen as natural and are produced correspondingly. Thus language learners are able to attain both accuracy and speed of retrieval for each minimal step in assimilating structure, which in turn at some point empowers the student with a certain fluency in conversation flow.

Thus language games serve the function of redundant oral repetition of grammar structures (morphological, syntactic) and vocabulary in a playful way. Students are not always aware that they are practising grammar. The ubiquitous play instinct redesigns the interaction with the foreign language: practice proves fun, repetition is not boring, and declarative knowledge is converted into procedural knowledge, that is, into spoken language, and stored in procedural memory.

The attentive reader will wonder how intensively learners should play/practise in order to trigger proceduralisation. There is no pat answer to this question, for proceduralisation is a subjective learning achievement that depends on numerous factors. From a biological viewpoint, the brain cells of younger learners build neural networks faster, and these networks are more resistant to decay; on the other hand, older people have stored more information and can often work better associatively, so that they can compensate for their weaker biological performance. How often a given learner must repeat cannot be specified *a priori*. Instructors should adapt the play modality and thus the repetition frequency to the respective learners, who usually study

language in homogeneous groups (school class, learners with SEN, university, adult education). We can only note that proceduralisation, like any learning process, occurs via the creation of stable neural networks that enable the retrieval of information. The number of games and the frequency of repetition that is normally used for proceduralisation should thus be adapted to the age and cognitive ability of the persons involved in the learning process.

The role of emotion in game-based learning

Clearly, playful handling of grammar is more entertaining than written exercises. If learners play during instruction, have fun at competition and success, and yet experience neither negative evaluation nor frustration due to their errors, then there seems to be no argument against the use of games. If they additionally facilitate achieving the goal of memorisation and oral recall, then games acquire a didactic purpose as well.

To what extent can a positive attitude toward content (foreign language) and toward instructional activities that are entertaining and fun, facilitate the learning process? What is the relationship between emotion and cognition, among fun, pleasure, learning and memorisation? Much has been written on this subject in recent years. According to LeDoux (1998), one of the most recognised researchers in this field, 'emotions ensue from cognitive interpretation of situations' (p. 54). The reason is that we are programmed to scan our environment continuously for danger and to adapt our behaviour. Thus we also assess any learning experience emotionally. At various times we might experience learning a foreign language as positive, or as troublesome, unpleasant, etc. Of interest to educators is that each emotional assessment triggers biochemical processes in our brains. Positive emotions stimulate, for example, the dopamine system, which controls motivation and rewards effects. Dopamine is a messenger substance (neuromodulator and neurotransmitter) that plays an important role in learning. It is termed a gating substance (Spitzer, 2003) and triggers numerous chemical phenomena, including the release of endogene opiodes, which cause happy feelings. Positive emotions enhance brain activity; this includes the growth of synapses and information transmission in the existing and resulting neural networks. Thus positive emotions promote learning not only in our perception but also from a neurological perspective (Birbaumer and Schmidt, 1996, p. 648)! In contrast, negative emotions restrain information flow by releasing stress hormones and corticoids, and in chronic cases can even cause brain damage.

If educators are aware of the important role of emotions in the learning process, then they cannot leave to chance whether learners are subjected to boredom or frustration in the course of proceduralisation of structure. Unfortunately educators have little effect on students' fundamental motivation (Macedonia-Oleinek, 1999a). However, they can strive to make everyday instruction as interesting and

full of variety as possible, so that students perceive the fun of the activity as motivation. Playful handling of vocabulary and grammar provides a good possibility. Although it is certainly not a panacea, practice of phrases and vocabulary learning can be pleasant and even fun moments in everyday instruction. In this context let us also mention the social aspect of learning which, according to renowned neuroscientists, also plays an important role. It also stimulates the dopamine system and functions as an amplifier for the learning process (Spitzer, 2003).

Problems with using games at school

Language games serve as an important instrument for attaining proceduralisation of morphological and syntactical structures in a foreign language. Language games require players, and a minimum of monitoring and control on the part of the instructor; thus the classroom provides an ideal environment for language games.

However, games also require time for essential repetitions. The duration of a game can vary according to the complexity of the targeted proceduralisation, but an average is about 30 minutes. Often a given topic might require three or four games. In most schools in European countries, language instruction lasts 50 to 100 minutes; this encumbers the utilisation of games or even renders it impossible. Teachers have to introduce a text as input and explain grammar aspects: hardly any time remains for essential proceduralisation via games. Under these circumstances we need to pose the question of whether the current allocation of hours in the school schedule for foreign language makes sense, and whether it would not be advantageous to adjust instruction time according to important aspects such as memory functions? In the given circumstances it is understandable that teachers transfer proceduralisation to the students' independent work at home, in the form of written exercises. However, we have already seen that course books contain exercises in inadequate quantity and in ineffective modality (written exercises to build oral competence). It is understandable why students often possess metaknowledge (rules in the foreign language), yet cannot speak the language.

Implications and discussion

We have explained how games can help learners to transform declarative knowledge into procedural knowledge and therefore enable them to retrieve foreign language at a speed and with an accuracy that makes real communication possible. Now, considering the importance of proceduralisation, the question might arise whether other types of exercises

should be considered, and whether the old drill patterns, indeed, still have something to offer? In our search for feasible solutions, in the proceduralisation phase – which is usually transferred onto homework – new media and e-learning programs could play a role. Frequently recurring structures and error control also cast in the form of a game could eventually lead to the targeted proceduralisation. However, I am convinced that even these technical possibilities can provide merely a second-rate replacement for real games that not only embrace repetition but also, due to group dynamics and social interaction, shape the learning process with fun and effectiveness.

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