# PEDAGOGICAL ASPECTS OF TEACHING LEVEL I ALPINE SKIING TECHNIQUE TO UNFAMILIAR STUDENTS

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**ABSTRACT**
*Considering the optimal connection between the three domains of the CAP system (cognitive, affective, psychomotor) identified in Bloom's B. taxonomy, we agree that in the organization of the specific didactic activity of alpine skiing, this must be manifested accordingly. This aspect is determined especially by the specificity of learning, in which the motor skills are open, so they take place in ever-changing, varied conditions, related to environment and relief. The problem of motor learning in alpine skiing has been studied for a long from the point of view of motor gesture and specific technical interpretation and less from the point of view of the cognitive aspect of learning. Within the educational process in alpine skiing, motor learning, which represents the process of acquiring motor skills, is delimited by motor control, which focuses on understanding the control of the learned (trained) skill, respectively its performance process. The motor learning process in alpine skiing is the subject of numerous experimental studies and research, focused on the facilitation and efficiency of learning, depending on the various types of needs of contemporary society.*

**KEYWORDS:** *cognition, contextual interference, motor learning, pedagogy, random practice.*

**JEL CLASIFICATIONS:** Z20, Z28, Z29

## 1. INTRODUCTION

Previous experiences, and recent research in the field of sports pedagogy and psychology, made possible a detailed outline of the general framework for the manifestation of specific motor learning in alpine skiing. The obvious outline in the field of motor learning of some educational strategies that promote an active and interactive involvement of the protagonists of the learning process, as well as the influence of new methodological guidelines in the field of physical and sports education, led to a careful evaluation of the processes that determine the acquisition of specific skills and the way to control their performance. The central problem of our study was the identification of a didactic method of intervention for fast and efficient acquisition of basic motor skills in modern alpine skiing, in relation to the effort of motor learning and the engagement of the subjects in the process of learning. The objective of the study was aimed at the learning effort of unfamiliar students (beginners), an effort that involves the stimulation of complex physical and cognitive processes, depending on the intensity of the learning task, its degree of complexity on the one hand, and individual differences or level of motor skills and degree of motivation on the other hand.

Previous observational studies and analyses (within practical skiing courses) have revealed that the element that mostly influences the learning process in alpine skiing is generated by the effort of the subject engaged in the task, his activism and degree of involvement, but also the effective way of organization of the learning experience, providing feedback and specific motor transfer.
Thus, the coordinates that were the basis of the structuring of a specific motor learning model were represented by:

- designing and organizing an effective training intervention to facilitate the initial acquisition of the basic techniques in alpine skiing.
- ensuring the efficiency of learning and motor control through random practice.

The current paper aims to provide a theoretical explanation of the pedagogical approaches put into practice by us in the motor learning experiences organized with students of the Faculty of Physical Education and Sport (N = 103), unfamiliar with the practice of alpine skiing and who, we hope, will contribute to further research in the field.

## 2. MOTOR LEARNING IN ALPINE SKIING – PSYCHOMOTOR ASPECTS

### 2.1 Cognitive mechanisms involved in learning specific motor skills

Motor learning in alpine skiing requires the existence of two solidary but complementary aspects: the procedural aspect (which includes the processes that make up the learning sequence) and the motivational aspect (which indicates the degree of involvement of the student in the act of learning and solving tasks). Motivation, which together with attention constitutes learning conditions, is particularly important in any of the stages of motor learning (Ionescu, 2003). These two factors lay the foundations for the phenomenon of activation, of cognitive mobilization. For the beginner, if the arousal level is too high, skill performance will be low. Learning a motor skill, whether fundamental or specialized, is an active learning process closely related to cognition. All voluntary movements assume an element of cognition, but the more complex the motor task, the more complicated the cognitive process involved. During learning, cognitive maps or mental images are formed that are memorized and are ready for reuse. While the habit is consolidated, the performance tends towards automation (virtual) with a relatively small involvement of cognitive processes, respectively awareness.

Regarding this, the teacher must intervene to help students learn both the concepts of habit and movement associated with how the body must move or can move. The acquisition of specific motor skills in alpine skiing (combinations of simple and complex motor tasks) assumes the implications of the following factors: *attention*, *perception*, *thinking* (analysis, synthesis, generalization), and *memory*. The complexity of the skill influences its acquisition, because the more complex it is, the more difficult it is to learn, and the longer the learning time. The quality of perception depends on the degree of focused attention. *Perception*, as a process of identifying and integrating sensations, contains aspects that can be learned or at least developed through experiences (Hayes & Orrell, 2003). The sum of stimuli coming from tactile (apparatus, specific equipment), visual, auditory, and kinaesthetic, determines the formation of certain habits, adaptations to situations or tasks that contribute to the performance of the motor skill in optimal conditions, thus explaining how during motor learning the skiers get used to the ambient and climatic conditions. We can thus delimit two categories of sources of sensory information, namely *exteroceptive information*, coming especially through visual and auditory analysers, and *proprioceptive* or kinaesthetic information (Schmidt & Wrisberg, 2008). If we consider the fundamental characteristics of motor learning in alpine skiing, we can delimit the importance of these sources of information in the control of specific movement patterns. The skier, based on the visual analyser, defines the ambient structure, the movement of his body segments, and through hearing estimates the character of his action (the sound of skis on snow can give important clues about the control of the pressure on the edges or the sliding speed). In the practical activities of alpine skiing, in order to perceive complex motor actions, we call to their simplification, to the analytical approach.

However, recent research in the field of motor learning (Schmidt & Wrisberg, 2008) has demonstrated that it is much more useful and efficient to start learning from the global form of practice which implies a better action of the sensory-perceptive system and representation. This phase, characterized

by gross errors of performing or perception, is particularly important for introducing the analytical phase of the learning sequence.
Within the mechanisms of secondary processing of information, *thinking* is in the foreground. For this reason, in motor learning, new situations must always be created that constitute incentives for thinking (variation of tasks, movement parameters, type of slope or snow).
In alpine skiing motor learning, *memory* represents the fundamental psychic function that makes it possible to fix, preserve, recognize (update) and reproduce psychic phenomena, having a special role in processing the information resulting from the production of motor tasks. The mnemonic information processing model (Malim, 1999) is expressed through the development of three fundamental stages: fixation (input), storage (organization), and re-actualization (data recovery for use). According to Coker A. (2004), long-term memory has memory subsystems: episodic, semantic and procedural. This component of memory is considered to be the storage space for accumulated experiences (Schmidt, 2008), considering that the effective learning of a motor skill occurs when information is processed in short-term memory and transferred to long-term memory.
*Attention* is a sine-qua-non condition of the act of learning, which increases its efficiency and facilitates it. By definition, it consists of the selective orientation and concentration of mental cognitive activity on an object or phenomenon, the attentional focus having a significant influence on motor performance (Wulf, 2007). Attention ensures a good sensory and perceptive reception of stimuli, a deeper understanding, a more durable memorization, and the selection of appropriate skills and habits. The factors that favor the involuntary concentration of attention are particularly important, seen from the perspective of the teaching activity, because the teacher must know these factors as ways of capturing the students' attention. External factors are represented by: the novelty of objects, phenomena, situations, intensity of stimuli, contrast, movement, and change of stimuli. The attentional focus (Wulf, 2007) in the motor learning process determines the consistency of the performance of the skills so that the attentional resources that must be directed towards the planning and execution of the action diminish with the progress in different stages of learning.

**2.2 Processing information in alpine skiing motor learning**

The performance of motor skills in alpine skiing, whether they are simple or complex, requires the existence of an information processing process, the quality and speed of which varies in different stages of motor learning. These distinct operations are the basis of the simple or complex processing model. The use of this information processing model gives us the possibility of describing a complex motor action, such as performing a Cristiania (parallel turn) in alpine skiing. The student uses his senses to detect stimuli, in the *stage of stimulus identification* (visual sensations provide information about the type of slope and the terrain profile, or the quality of the snow), and through the *perceptual mechanism* (influenced by personal styles, motivation, and previous experience) he interprets the information received. Many of the specialists tend to underestimate the importance of perception, believing that those who are present in the same situation perceive the same things and that in general, these coincide with their perceptions. Initially, visual information is mainly used, but later this will be better supported by internal (proprioceptive) information.
When a movement is made, many sensations are perceived. It is about sensations relative to accelerations and decelerations, the force produced, variations in the angles in the joints, and dynamic balance. The information provided helps to make an *execution decision*, in the *response selection stage* (execution of a cristiania by absorption, because the terrain profile requires this), a partially conscious phenomenon in order not to delay the decision and the execution. The effector mechanism organizes the information (the *response programming stage*) and sends messages through the nerve endings, to the muscles interested in the execution of the movement (the messages are sent to the muscles with a role in ensuring active flexion (the process is even more complex because both a dynamic balance and an anticipation for the following actions under different conditions are made).

*The output* is represented by the complex motor action produced (the result of the action of the three stages of processing): the Cristiania by active absorption. As for the feedback, the internal one provides information on the *sense* of the movement during its performance and the external one is important because it provides information on the performance of the motor skill.

**2.3 Motor control**

While motor learning deals with the study of the acquisition process of motor skills, *motor control* is a distinct process aimed at the execution, the performance of the skill, in the sense of its control (Schmidt & Lee, 2005). Once the subject decides to perform a motor action, specialized parts of the brain must decide how to control the muscles involved in the execution of the movement. Based on this consideration, the study of motor control *must include the study of the cognitive processes involved* (attention, motivation, emotional aspects) *about perception and action* (Cook & Woollacott, 2007, p. 5), through the prism of a cooperative effort of the cerebral structures. The control of motor action is substantiated through the prism of the theory based on the concept of a generalized motor program, which is considered to contain rules for creating spatial and temporal patterns of muscle activity (Schmidt & Lee, 2005). This control (Figure 1) is an open-loop control. Feedback is present but not used in motion control.


**Figure 1. Open circuit model of motor control.**
*Source:* adapted from Davids, K., Button C., Bennett S., (2008)

The theory of Schmidt R. (1975), also known as the *schema theory*, presents the idea that starting from a generalized motor program, motor response schemes are elaborated that particularize the motor program manifested to a concrete movement with specific consequences and results. According to this theory, when learning a new motor program, one learns a generalized set of rules that can be applied in various contexts. Central to this theory is the concept of a schema, an abstract representation stored in memory. A schema represents a set of rules on the execution of an action about the feedback received during (concurrent) and after the performance of the motor task (terminal). Schmidt R.'s scheme is based on the theory that when a motor action is performed, four types of information are gathered, and directed to the short-term memory:
- *the initial conditions of the action* – the starting point, the position of the body or body segments
- *certain aspects of the motor action* (parameters used) - how wide? how fast?
- *the result of the action* (effect) – success or failure
- *the sensory consequences* of the action.

This information is stored in short-term memory as long as it can be abstracted into two schemas. The relationships between this information are used for the construction of a *recall schema* (applicable in new action conditions) on a motor level in the production of movement and a *recognition schema* on a sensory level, in the assessment of the accuracy of selected movements. Each new motor action brings new data into the system that determines a refinement of the set of rules used.

**2.4 Feedback in the motor learning of the basic technique - practical implications**

In the initial phase of learning, the student benefits from imprecise information about how to perform a motor task, focusing his attention on the aspects that make the transition to the environment or actions with which he is not familiar. The beginner skier will make a considerable effort to maintain dynamic balance and avoid falls. At this moment, he does not benefit from information to help him control his movement, and even through the observation of a technical model he cannot correctly interpret what exactly he must visualize, or on which actions he must focus his attention. The intervention of the teaching staff in the direction of developing the ability to analyse and control motor actions is obvious and necessary, to facilitate the perceptual mechanism. All this information that the teacher receives from the student in response to the required topic, is vital for structuring the learning experience. An important aspect is generated by the type of information provided, which generally boils down to the corrective aspect, so it has a negative characteristic, in the sense that it signals the presence of an error produced during execution. Quite rarely, feedback is provided to confirm the correctness of a motor action, to motivate the action. Another problem that influences the *learning effort* refers to the amount of information that the teacher provides to a student, especially to the one in the first phase of learning.

The possibilities of analysing and understanding a large amount of information are limited, it develops along with the motor evolution of the individual, a fact that must lead the teacher to ensure learning experiences that facilitate motor acquisition and communication. In this sense, there are two fundamental rules for ensuring feedback in the learning activity:

- the feedback provided by the teacher must be complementary to the information the student receives through the sensory (autonomous) mechanism
- the feedback must always provide relevant and usable information

The teacher's communication skills are decisive, knowing how to communicate is much more important than knowing the technique, especially if the type of students they come into contact with is diversified. Non-verbal communication is particularly important in the field of motor learning in alpine skiing, its forms manifesting in: looks (direction, frequency, intensity), gestures, facial expression, posture, voice tone and rhythm, pauses in communication, help given in making movements, managing space (approach/distance). A representative consideration is given to the type of message, because the levels of communication can be multiple, and messages intended for two different reception channels can contradict each other. Feedback, as a source of information frequently used during the motor learning process, includes various forms that refer to verbal, visual, or kinaesthetic information. Supporting performance through feedback, reward, and encouragement (Crane, 2004) can stimulate the learning effort. This type of information related to movement is classified into *intrinsic* and *extrinsic* information, or additional information (Grigoras, 2013).

### 2.4.1 Premises of proprioceptive and exteroceptive feedback in motor learning experiences

*Intrinsic feedback* represents *the sensory information provided when a movement occurs* (Schmidt, 2008, p. 285), which can be integrated through external (exteroceptive) or internal (proprioceptive) sources. The information that a student engaged in a motor learning sequence obtains is decisive for being able to find out what he needs to obtain, how to obtain that thing, and modelling the motor program used. Information can be received previously (feedbefore – anticipatory control where sensory information is used to a minimum) during or as a result of the action (intrinsic and extrinsic feedback). Intrinsic feedback is obtained by the student as a result of the learning task. For example, in the preparation of a sliding action on skis, the student receives internal feedback regarding the position of the skis and the lower limbs, as well as the position of the body in sliding. Danielson R. R., (2004) defines intrinsic feedback as the type of feedback that does not involve external help and is based on *exteroceptivity* (information from outside the body) and *proprioceptivity* (information from inside the body). We can thus delimit the *exteroceptive feedback* as the result of the movement, provided through the sense organs, the observation of the result by the student, observations by the

teacher, and observations using technical means, so a predominantly visual character. As for *proprioceptive feedback*, it provides information from proprioceptors in muscles and tendons that provide details about the sense of movement, students use this type of feedback to make fine corrections to performance (this is what in alpine skiing we call piloting action).
*Extrinsic or additional feedback* represents *the information received from external sources that supplement the student's sensory information* (Coker, 2004, p. 215) and is generated by the verbal means provided by the teacher or by using mechanical devices or additional means which ensures the efficiency of learning. In this way, the intrinsic feedback that regulates the motor actions of a skier can be supplemented by the external feedback, through verbal information provided by the teacher in terms of the positioning of the body or its segments in dynamic balance. Through additional feedback, necessary information is provided in learning situations where consolidating or improving motor skills is difficult or impossible to achieve. Recent studies have demonstrated a negative impact on learning in the case of providing additional instant feedback, hindering the development of error detection and correction mechanisms and the evaluation of intrinsic feedback.

## 3. PREPARING AND STRUCTURING MOTOR LEARNING EXPERIENCES

The learning experience can be defined as the deliberate attempt to improve performance (Danielson, 2004), a situation in which individuals can perform both individually and within the collective activity (Schmidt & Wrisberg, 2008), a component that refers to the personalized way of internalizing the learning situation, objectified in changes in cognitive, affective or psychomotor structures (Bocoş, 2008). Within the learning experience, a significant role is played by abilities, considered as genetically founded tendencies that are the basis of learning, abilities, which are benchmarks in the development of performance, and the degree of motor learning understood as an internal change resulting from the practice of a motor task. The learning experience in alpine skiing has a dominant characteristic, generated by the specific climate in which the activity takes place. To be able to respond optimally to the learning tasks, the student must be aware of the objectives of the activity (process or performance), the goals and themes of the lesson, the specific way of carrying out the activity, and the educational climate. The teacher's communicative qualities are decisive in establishing and supporting an activity that corresponds to the specific requirements and needs of the subjects he works with. Active learning is not synonymous with overcrowding the student with activities, it should be understood more as an intensification of the teacher's work to offer them learning opportunities, teaching is the activity through which the teaching staff creates favorable conditions for the emergence of learning.
In the preparation and structuring of learning experiences, the following aspects play a decisive role:

1. *Student familiarization and communication.* This aspect of the learning process is a basic condition in the activity carried out on snow because the working conditions and the specific equipment can have a decisive role in terms of the student's availability for learning. The mode of communication chosen by the teaching staff has implications on the way of perception of the students and their performance in the practical activities. Familiarization with the instructive-educational process involves the communication of what is expected because the fear of failure is a negative factor in learning progress.
2. *Direction of attention*. It considers how the attentional focus is directed within the component: internal (body movements), external (environmental factors, spatiotemporal landmarks), limited (a movement, a part of the body), or expanded (several movements, body segments), as well as the change of attention during a movement (ambient focus – analysis of the conditions for the execution of the movement, the decision regarding the type of movement chosen, focus on the image of the movement).

3. *Optimization of the activation level*. A particular problem in the first stages of learning is caused by the way performance evaluation generates anxiety (Wrisberg, 2008). The solutions to this problem are given by emphasizing the process objectives and not the performance ones. In other words, the teacher must be more interested in the quality of the activity than in its product and must help the students in establishing real objectives that can be fulfilled.
4. *Creating alternating moments between effort and rest.* A considerable difference is given by the choice of work strategy. In planning the practical activities with the students from the specialized faculties, both the number of days of the training course, as well as the duration of the practical work and the duration of the breaks between them, will be taken into account. In this sense, it is considered that the type of distributive, short activity (*distributed practice*) is more effective than the long, continuous activity (*massed practice*).

**3.1 Forms of organizing the practical activity with unfamiliar students**

Within the motor learning process of skiing, two effective ways of organizing the activity are distinguished from the point of view of the practical context: *constant practice* and *variable practice*. Also, from the point of view of the structure of the motor task, *analytical practice*, and *global practice* are distinguished. The way of organizing and structuring the practical activity in the case of complex motor skills, i.e. of a large number of actions within a lesson, is considered to be particularly important in the learning process. These variants of practice organization are known as *block practice* (grouped) and *random practice* (Grigoras, 2013).

The form of analytical practice is defined by Davids et al., (2008) as part-task training. The analytical or global approach largely depends on the nature of the motor task, and its degree of complexity. Complex motor addictions may require their segmentation for better awareness of the component elements, after which it is possible to proceed to the global performance of the motor task. Depending on the variability of the practical context, variable practice, and constant practice are distinguished. *Variable practice* involves performing versions of the motor skill. In other words, it is not enough to perform a motor task in stable conditions, because the open-type skills in alpine skiing require variations (of sliding speed, trajectory, and distance) depending on the slope, snow, and relief of the slope. These variations include variations in the physical conditions and performance situations of motor skills, actions which, ironically, initially lead to errors in the performance of motor tasks (Magill, 2007). We can exemplify these types of practice within the instructional process specific to alpine skiing as follows: constant practice has a single, uniform version of the skill (task A), while variable practice involves the performance of variations of the skill (A1, A2, A3). In the practical activities specific to the discipline of skiing in higher professional education, unfortunately, a relatively uniform organization of the practice sessions is observed, overlooking the objective of the discipline, that of acquiring through learning possible variations of the skills specific to alpine skiing. *The practice in blocks of motor tasks* delimits the way to practice several skills within a practice session, by passing successively through all the stages of the formation of specific motor skills within a motor task, after which it moves on to the repeated execution of the next task. In our case, this type of practice delimits, for example, the repeated practice of the braked plough (task A) until the level of automation, then of the sliding plough (task B), after which we move on to snowplough turn (task C). Most of the time, the practical activity within the skiing courses with beginner students is organized in this form, faithfully following the methodical sequence of the technical procedures within the method of learning the technique. This way of organizing most of the time generates some monotony in the activity through continuous repetition but ensures performance with constant indices within the practice sessions.

Another form of practice common to the learning of several motor skills in one learning session is *random practice*, which involves a planned mixing of motor tasks, thus ensuring their non-consecutive performance. Random practice of motor tasks may slow the initial acquisition of the skill,

but it will be more effective for long-term retention (Lee & Schmidt, 2005). Exemplifying this type of practice in alpine skiing, motor tasks can be performed according to the model: BAC, CBA, ACB. According to the *forgetting hypothesis*, when students switch from task A to task B during practice, they forget some aspects of how to perform task A while thinking about how task B should be performed. Returning to task A later in the same practice sessions is done by regenerating its performance plan. This hypothesis is also known as the *action-planning-reconstruction hypothesis*. In any of the work variants, the determination of interest in learning, the awareness of learning for the formation of one's own style, and the activation of the individual element will be pursued, knowing that one's own activity is the basic link in the motor learning process. In general, due to the short time available, and the impossibility of creating an own teaching space, and individual strategies, the teacher (or team of teachers) resorts to a frontal activity that ensures a better visualization of individual interpretations and easier communication. Contemporary practice demonstrates the fact that for an effective, activating, and motivating activity, it is necessary to resort to various forms of group organization depending on the lesson's themes, objectives, characteristics, and working conditions.

**3.2 Particularities of active learning in motor learning experiences**

Learning or consolidation lessons intended for beginning students will benefit from particular attention for the purpose of familiarization and activation. In choosing the means, a decisive role is played by the *creation of the problems* that the student must solve. Some specialists (Dillon cited by Oprea, 2003) are of the opinion that finding the problem (problem finding) and not solving it (problem-solving) is more important. Thus, in the motor learning process of skiing technique, the main objective is to influence the *decision-making* and *control mechanisms*, in order to identify technical errors and causes that determine their appearance. Later, with technical consolidation, self-control becomes evident, fine correction manifesting itself at a higher level. For this to happen, however, it is mandatory to develop didactic strategies through which problems are constantly exposed (the form of practical exercise, the form of control) and implicit adaptations of the motor program to solve them correctly. In this way, problem exercises will be used, in the solution of which the student's contribution will be as large as possible. Alpine skiing does not represent a cyclical behavior, the variety of situations and conditions to which the student is subjected generate unlimited problems, the solution of which must be done at the moment.

The collective lessons represent the common form of organizing motor learning experiences within the practical skiing internship in the specialized faculties, characterized by a didactic strategy different from that of individual lessons, given the particularities and size of the group being worked with, the space on slope, way of communication, etc. The main problems are the variety of students' characteristics (in terms of attention and motor interpretation) and the fact that they ski less and listen more. In this case, a particularly important factor is the judicious organization of time and workspace, by choosing the most appropriate exercises and routes. In this educational climate, cooperative learning is evident, as the tasks are proposed to the entire group of students, thus achieving a positive interdependence between group members, individual and group responsibility, constructive interaction, social skills necessary in interpersonal relationships, and self-evaluation.

If until now the student passively attended the classes and received the knowledge from the teacher, contemporary studies demonstrate the fact that the quality of the act of teaching and learning is improved when the students have ample opportunities to clarify, question, apply, and consolidate the new knowledge. In this case, the teacher creates a specific working atmosphere, through which the students assimilate the material to be learned (specific motor skills and their acquisition method), being the only one who guides them and helps them understand and apply the information. The student and his knowledge needs are the central points of active learning, there are many strategies through which he is actively engaged in the learning process, including group discussions, problem-

solving, case studies, role play, and activities whose benefits are found in improving critical thinking skills, strengthening the transfer of new information, or increasing the degree of motivation. The use of active learning techniques does not imply giving up the classic forms of training, but structuring them according to the particularities of the group, the time available for learning, and the working conditions.

**3.2.1 The motivation for learning - from interest to involvement**

Motivation influences the student's degree of receptivity to the learning task, representing *the set of factors that trigger, energetically support, and direct the learning activity* (Bocoș & Jucan, 2007, p. 38). Studies in the field of motor learning (Coker, 2004; Schmidt, 2005) have demonstrated that subjects who are motivated will explore, practice, and use thinking processes more effectively, having a strong desire to perfect the specific motor skill. For this purpose, the teacher must recognize the subjects motivated to learn, those with prejudices, or those who are not aware of the relevance of the action to be learned. For this reason, the introduction of a new skill or motor task must capture the student's interest, and simply explaining the objective is usually not enough. Those involved in the learning process must be aware of the reason why learning that skill is important, which can represent the development of a base on which to build subsequent skills.

Creating a positive, stimulating, but realistic learning climate is a way of increasing success in skiing lessons, increasing motivation, and eliminating stereotyped, boring, routine moments. The factors that influence learning possibilities and rhythms are not only represented by physical characteristics, motivation, or intellectual maturity but also by other characteristics that differentiate subjects from each other. Some individuals seem to acquire the movement only if they are subjected to a large number of tests and repetitions, while others, observe their colleagues very carefully and try to solve the tasks on their own.

**3.3 The transfer of motor skills in the practice of alpine skiing**

In the case of the absolute beginner, the ineffective skill that generates mistakes in the execution or interpretation of a motor task derives from the inability to correctly adapt the motor program to the specific situations within the activity. On the other hand, there are situations in which students manage to have satisfactory motor performances from the first attempts, due to the fact that the programs used to solve a previous task have common aspects with those of the current task and are adapted to these new circumstances. This phenomenon of skill transfer is of particular importance for the design of the practical activity within skiing courses, in order to detect early the elements that negatively influence a certain motor skill, and also to optimize the way in which the transition from a certain motor task to another, based on previous experience. Initially, this adaptation is imprecise, with mistakes and hesitations, but with time it tends to become precise and efficient. This means that an individual who has complex motor experiences, that is, who has successfully practiced different sports or practical activities, may be favored in the faster acquisition of a new motor action (skills), or, his performance may be negatively influenced due to an incorrect adaptation of the engine program. In the practical activities specific to skiing courses, the context of learning differs just as the context of the application of motor experience differs. The motor actions specific to the alpine skiing technique follow each other thanks to previously memorized motor programs, based on which the precision and adaptation to new environmental situations, but also of a technical nature, are successively finished during the executions, the discovery of mistakes, the intuition and the observation of the technical model. The sum of these experiences accumulated over time influences the ability to learn new skills. The explanation of the transfer phenomenon starts from the premise of using the principles, concepts, or skills learned in a certain context, in a new context in which they are applicable. Depending on the effects they generate on the motor tasks in alpine skiing or on any

act of learning, positive transfer or facilitation and negative transfer or interference (inhibition) are defined.
If we refer to the alpine skiing discipline, the previous motor experience related to the sliding plough process will facilitate or accelerate the way of learning the braking plough sliding process. The positive transfer represents a desideratum of the instructive-educational process, based on the idea that the acquired will be easily applied in similar situations. Negative transfer is determined by motor actions or habits that negatively influence, disruptively, a subsequent habit. The negative transfer in skiing can be manifested in the case of an influence of the skill specific to freestyle swimming, which involves a rotation of the trunk around the longitudinal axis, an element that is detrimental to learning the skiing technique. In this case, we are talking about inter-task transfer, which manifests itself when the skill from one sporting activity is transferred to the practice of another sporting activity. Another situation in which the transfer can manifest is the intra-task transfer, which takes place within the same sports activity (the influence of the skidding action in the case of the driving phase of parallel bypasses). A negative influence in learning a motor task is also manifested if the perceptual elements (the stimulus for the practical action) are identical, but the subject's reaction may be different. In the case of learning several technical procedures, the student will be put in a position to perform a certain procedure depending on the immediate requirements. The efficiency of the action is given by the type of procedure that dominates as intention or motor montage. We, therefore, consider it appropriate to identify the effects that the randomized practice of motor tasks manifests by creating obvious contextual interference. To facilitate understanding, the teacher can use analogies and comparisons between various motor actions in the didactic process. This is particularly useful in the skiing lesson when students are found to have some motor experience and can distinguish between particular aspects of movements and analogies of similarity.
Within the motor learning experiences specific to alpine skiing, it must be taken into account that the transfer is beneficial to students in the beginner stage, to a greater extent than to intermediate or advanced ones.

## 4. TEACHING STRATEGIES WITH IMPROVING POTENTIAL IN THE PROCESS OF LEARNING THE BASIC TECHNIQUE OF ALPINE SKIING (LEVEL I) BY UNFAMILIAR STUDENTS

The previous didactic activity highlighted the fact that a revision and adaptation of the model of the basic technique of alpine skiing is urgently needed, in order to correspond to the current requirements of specific practice, but especially of the didactic strategy for the efficiency of motor learning. These aspects determined the development of didactic strategies to improve the practical activity within the alpine skiing courses with FEFS students and optimization of specific motor learning, which refers to the use of random practice and feedback.
We believe that didactic strategies that involve varied motor experiences, group interaction, activation, and varied feedback, have ameliorative potential in the motor learning process of the basic technique with unfamiliar students.

### 4.1 Random practice – the contextual interference effect

The quality of specific practice sessions leaves its mark on the quality and efficiency of motor learning. If we consider the practical skiing course in higher professional education, we can say that the time required for specific motor learning is relatively short. Our main objective is to organize a practical course that reflects the methodical system of learning the basic technique in alpine skiing, as a whole, through which the student will be able to perform tasks in various conditions, in a relatively short period of time in a short, at the same time ensuring the basis of specific later skills. When a ski course does not meet these conditions, then it is possible that the activity is ineffective

and the basic objective cannot be met. So, the purpose of the didactic activity specific to the discipline of skiing in higher education is not the performance at the mastery level of the skiing technique, but the knowledge of the basic aspects of all the technical procedures within the basic technique, their motor learning in stable conditions in order to be able to consolidate and perfect later, in order to use this knowledge in the organization of specific, subsequent motor learning experiences. Studies in the field of motor learning in alpine skiing in our country broadly describe only two variants of the practice method, from the point of view of the structure of the skill, namely analytical practice (breakdown of the technical skill) and global, intuitive practice (Teodorescu V., 2000).

We believe that one of the effective forms of organizing the practice activity in the skiing course with the students of the specialized faculties can be represented by random practice. This form of organizing the practice activity for learning multiple motor skills, as described by Schmidt and Wrisberg (2008), involves the performance of distinct motor tasks in a randomized sequence, avoiding the consecutive repetition of a task (in our case technical skill or technical exercise). In contrast, the practice in blocks of motor tasks, which Dragnea and Bota (1999) call group practice, involves the performance of a single motor task repeatedly, a form of practice that is found in most cases in order to automate the skill, after which the performance of another motor task is carried out. The question that derives from this is the following: *what is more important for a future training student, to perform a snowplough at the automation level or to perform a descent along the entire length of the ski slope by adopting various technical bypass skills, in variable conditions in terms of the consistency of his actions?*

The significant difference between the form of organization of practice sessions by randomization, compared to the modality of practicing in blocks of motor tasks, is the variable nature of motor performance. This variable character of the practice refers to the mix of technical tasks within the basic technique of alpine skiing, a mix that implies a design of the practice depending on the type of slope on which the activity is carried out, the themes and objectives of the practice sessions and the characteristics of the group. This pedagogical approach ensures the increase of motor density in practical sessions, by ensuring the conditions of majority sliding, in varied contexts. The variable nature of the motor performance during the alpine skiing practice sessions determines a particular mode of interference that can facilitate learning. This *contextual interference* is manifested by switching from performing one motor task to another or changing the performance context. In alpine skiing, the use of random practice involves variable practice, due to the open nature of specific motor skills. A hypothesis underlying the contextual interference effect was proposed by Lee and Magill cited by Coker (2022) and is known as the *forgetting hypothesis*. According to this hypothesis, the transition during the practice session from task A to task B produces a temporary forgetting of some aspects common to the first task due to the involvement in solving the second one. Returning to task A promotes the regeneration of the action plan, which causes the initial performance to be relatively low. Random practice thus becomes a much more rigorous way of performing motor tasks, from the point of view of the cognitive mechanisms involved in motor learning, compared to the grouped form that involves the application of a constant plan of action, which determines a relatively good but false initial performance from the point of view of generalization. For this purpose, we consider that learning must promote a constant cognitive effort, which involves the continuous generation of new action plans in order to perform various specific motor tasks, in various contexts, so an activation through variable practical action, induced effects of the exercise in randomized form. This process of selection and programming of the response based on the different parameters of the motor tasks involves *learning difficulties* that are the basis of the motor learning specific to alpine skiing.

One of the most important characteristics of random practice is that of facilitating transfer and long-term learning. In contrast to the traditional practice in the ski courses through which immediate performances are obtained that can only be used for evaluations within the discipline, we believe that random practice creates the premises for the construction of motor programs that can be used in the

long term. The planning of a random practice session takes into account several elements that concern: the stage of specific motor learning, the size and characteristics of the group, and the characteristics of the practical activity area (slope angle, slope profile, and snow characteristics). From the point of view of the learning stage, the intervention through repetition in blocks, within the verbal-cognitive stage, is considered appropriate. This is based on the fact that those in a new learning situation with which they are not familiar, need repeated performances of a motor task in order to produce a plan of action. In contrast to learning experiences in blocks of motor tasks, random practice does not ensure immediate success and most of the time involves many execution errors (errors that actually form the basis of learning). This explains the non-use of this type of practice by many specialists in the field. On the other hand, planning a randomized activity can decrease the motivational level of the learners (if it is not supported by effective feedback), for this reason, it is particularly important to make them aware of the beneficial effects of the activity and the possibility of successful performance in variable contexts. In this direction, the activation of education subjects and the creation of an optimal learning climate are mandatory. The workspace is a determining element in the organization of a random practice session, through its basic characteristics: width, slope angle, differences in level, and relief, ensuring the development of the activity according to these characteristics. Considering the fact that most ski courses are organized on easy to medium slope sections in terms of difficulty, what we call the school slope, in the initial phase there are no major problems in organizing the practice sessions. If in the activity with students of small school age, it is appropriate to initially use forms of practice in blocks or series of repetitions, the activity with students can be oriented towards a simple initial randomization, which avoids the monotony and routine of practicing some initial actions with a low degree of difficulty. In this sense, we mainly rely on existing motor skills and previous motor experience, which can facilitate random performance of tasks within a practice session. On the other hand, the specifics of learning in alpine skiing require a variability of technical executions due to the learning context, in order to make maximum use of the working space and the time available. As we have shown, the progression and sequence of motor actions within the form of random practice go from simple to complex, from simple randomization, in which two or more technical tasks can be found during a practical sequence, to a complex randomization, which assumes that within a practical sequence, a technical task should not be performed twice or at least not in the same practical context. Depending on the sequence of motor actions and the implications that derive within the executive mechanism of information processing in motor performance, we can delimit two forms of the random type of organization of practical activity on the ski slope: *simple randomization* (performance of non-consecutive motor tasks with the possibility of repetition of a task within the same practical sequence) and *complex randomization* (the same motor task is not performed twice within a practical sequence). Let's assume that in a specific practical session, our objective is to learn three different technical procedures, which must be performed ten times to ensure the creation of an action plan and the development of an adequate motor program. These technical procedures can be represented, for example, by snowplough turn, vertical balance cristiania, and lateral skidding (which we note with A, B, and C), technical skills different in structure and trigger mechanism, therefore involving different motor programs. Within a learning session, these procedures can have different versions of execution from the point of view of the turn approach, travel speed, amplitude, slope angle snow type (variations we note A1, A2, A3; B1, B2, B3; C1, C2, C3). The specificity of the discipline and motor learning in alpine skiing determines a combination, a permanent mix of randomization forms, for this reason, it becomes particularly important to understand the way in which motor actions are performed, the differences between their parameters, and between the practical contexts in which they can be performed. These variations of the technical tasks (Table 1) reflect the movement parameters related to the turn radius (short radius, medium radius, long radius), the type of slope (semi-flat, medium slope, steep slope), the type of snow on which the task is performed motor, as well as the degree of manifestation of the speed and strength indices.

| | |
|---|---|
| Practice session in random form | $B_1A_2C_3$, $A_1C_2B_3$, $C_1B_2A_3$, $A_1B_2C_1$, $B_1C_3A_2$, $A_3C_1B_3$, $C_1A_3B_3$, $A_1C_2B_2$, $C_1B_2A_2$, $B_1A_2C_2$. |

**Table 1. Variation of the sequence of motor tasks in a practical session**
*Source:* Grigoras (2013)

Without performance in varied contexts of varied motor tasks, motor learning specific to alpine skiing will not be complete. From this point of view, random practice in varied contexts by using the practical part as a whole, can solve two big problems: the first is represented by the difficulty of delimiting a school slope, and the second by the inefficiency generated by working in constant contexts on the transfer in learning. In other words, in order to facilitate the transfer of skills, it is indispensable to ensure the conditions for practicing the skill being learned in situations similar to the target context. This is possible in motor learning specific to alpine skiing by delimiting a randomized form of practice with a variable character, which involves working on the entire length of the slope, without putting into question either the safety or the organizational nature of the ski lesson.

**4.2 Structural model of the basic technique (graduation of technical skills)**
The methodical progression within the basic technique of alpine skiing is carried out on the basis of general and specific pedagogical principles, training courses for motor skills, and the particularities of the discipline. This gradualization of the technical skills actually reveals the construction of an efficient model of learning the basic technique. We are of the opinion that such a model must be structured respecting a methodical gradualism in the progression of the learning process, starting with the *entry-level* (initiation phase – the first contact with alpine skiing) and then going systematically through the other specific phases, respectively: *the basic acquisition* (beginner level), *consolidation* (intermediate level) and *improvement* (advanced level). From the point of view of the content, the basic technique of alpine skiing must meet the requirements of practicing the discipline on the one hand, understanding the implications generated by the technological evolution in the field, the current needs of the recipients of the learning process, the significant changes in the competitive technique which involves changes in the fundamental technique, but also the traditional guidelines on the other hand. Through the lens of these considerations, we believe that an effective system for learning the basic technique of alpine skiing must be simple in structure and relevant in content. The methodical progression within the basic technique of alpine skiing is carried out on the basis of general and specific pedagogical principles, training courses for motor skills, and the particularities of the discipline. *Technical level I* represents the *beginner* level, in which the content reflects the tools necessary for the basic purchase. Due to the fact that this level is the entry-level, the first aspect is related to familiarization and knowledge of the specific equipment. Within this first level, within class A, the fundamental elements of the school slope (global initiation) are identified, as well as the fundamental positions and the initial elements of sliding on snow (basic acquisition). Class B corresponds to the initiation of bypass skills and the technique of using mechanical means of climbing. The beginner level contains a number of 15 technical skills, as well as specific fundamental movements (fundamental positions and actions), the sequence of which is a gradual one depending on their complexity and is given by the specifics of motor learning in alpine skiing. The *global initiation phase*, or the entry-level, represents the learner's first contact with alpine skiing, with the environment and the specific equipment, as well as with the basic concepts. We consider this stage of initiation a defining one for the subsequent motor evolution because this first contact creates various psychological dynamics through which the instinct of conservation and safety are put in the

foreground. Considering the input characteristics of the students, it is indicated that this stage takes place in a pleasant and safe environment. In this stage, the knowledge of the group and the establishment of communication relationships take place, developing trust and showing interest in the activity. Once the students are familiar with the equipment and the environment, it is much easier to propose activities that aim to identify the fundamental movements in alpine skiing (static balance and dynamic balance). The gradualization of the technical skills of sliding, braking, and tourning determines the creation of the premises for the acquisition of fundamental skills, the basic objective of technical level I.

## 5. CONCLUSIONS

The present work aimed to highlight particular aspects of motor learning specific to the discipline of alpine skiing, within the practical activities specific to higher education, based on the organization of stimulating and varied learning experiences, according to a coherent methodical system, in order to improve the learning process and strengthening basic motor skills, specific to contemporary alpine skiing. Our previous observations have demonstrated the fact that there is an urgent need to research these issues and develop some operating systems that correspond to the diversified requirements of students, based on individual characteristics, learning styles, and motivation. As a practice method, the random practice aimed to problematize specific motor learning and activate the students, along with maximizing the motor density within the practical sessions. The multitude of randomization variants within a learning session must therefore correspond to a previous planning based on the criteria listed above, the performance sequence of the motor tasks depending mainly on these elements, considering that the form of variable practice must be implicit, to make transfer and generalization more efficient. The method of random practice thus becomes a modern variant of the method of learning motor skills through repetition, thanks to its active character, able to trigger effective engagement in the activity, to stimulate the motivation and fundamental cognitive processes of the students. In alpine skiing, the motor learning of the basic technique is not fully deepened until the practical action takes place through individual or collective active involvement, exchange of ideas, analysis, reflection, discovery, and problem-solving, so interrelational cognitive and motor learning. Considering the fact that contemporary alpine skiing no longer corresponds as an organizational system, technical interpretation, and means of action to traditional skiing, a reconsideration of the aspects related to the learning methodology, the distribution and orientation of the effort in the learning activity, as well as the graduality of learning, aspects of general interest through the prism of educational reform in the field. However, we consider it necessary to delimit the way in which the random practice of skills specific to alpine skiing influences the motor learning of students, especially those of young and middle school age. In this perspective, we consider that the study carried out by us opens new horizons in the direction of practical methods of action, further research in this sense being decisive. The cognitive processes involved in the motor learning of the skiing technique are proving to be more and more important. The methods of influencing and developing these processes lead to the reconsideration of some didactic strategies, in order to ensure deep, consolidated learning. In this way, what is learned is well retained and helps to transfer or adapt to different situations encountered in the post-training educational process, in which students will demonstrate their skills.

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