

Chapter 8

Psychological Grounds of the Process of Automation



Outline of Lecture 8

Galperin starts by referring to the previous lecture, in which the process of skill development was considered. He describes the internal process of skill development as the transformation of the unfolded and divided into units action into one indivisible process. After the automation of the action is achieved, the learner performs the action by (i) recognising the situation and (ii) performing the action according to the image of the action he or she has developed previously. This process is termed *acceptance of the action*. However, from a psychological perspective, Galperin describes the acceptance of the action as the development of an image or a model of an action. He emphasises that skill development should not be understood as a process of memorising the action's structure by subsequently repeating and improving it. Instead, skill development involves the processes of transformation and change that can be developed gradually in learners. During these transformations, the actions performed by learners undergo considerable change. To develop an action, the following steps may be followed: (i) the model of an action has to be identified and presented to the learners; (ii) the model of the action should be divided into individual manageable units with specific characteristics (secondary structure). The *secondary structure* of each unit should be recognised by the learners. This structure assists learners in performing the action. The characteristics of the entire action comprise the *primary structure*, which also has to be presented to the learners. Understanding the primary structure is crucial in the process of *action automation*. Galperin argues that the process of the action automation is based on the development of conditional relationships, which is often understood as *stereotyping the action* by monotonously repeating it. However, stereotyping can also be achieved by identifying common parts in different actions. This approach is beneficial because an action can be applied in many other circumstances and situations, and it creates a positive basis for the generalisation of learners' skills to other applications, which is termed *skill flexibility*. Galperin explains that skill flexibility can be developed in the orienting part

of an action when learners are introduced to the main conditions, circumstances, and situations in which the target skills may be applied. First, a generalised basis of the action should be identified (skills), and then different tasks, circumstances, and situations where these skills can be applied should be introduced. Learners may apply the developed skills and actions in different situations. It is concluded that skill flexibility (automated action) is achieved when it can be applied by learners in various tasks, situations, and circumstances. Galperin summarises that (i) when action automation happens, learners do not need to examine the situation, but to recognise the situation that was introduced previously. The learners' performance of the action is controlled by comparing the actual flow of the action with the image of the action developed by the learners; (ii) in automated actions, the learners' detailed orientation is substituted by the recognition of the situation and the comparison of its specific characteristics with the action's generalised orientation. The control of the action's performance happens by comparing the actual flow of the action with its imaginary model. When the action becomes automated, it acquires *expressiveness*, which has a double meaning: (i) it is directed to the outside world and (ii) it connects the acting person with other people. Expressiveness simplifies the task and reveals the orientation of the acting person. Finally, Galperin summarises his study on the development of mental actions and identifies other psychological phenomena that warrant study, such as attention, thinking, creative thinking, memory, dreams, feelings, and will.

Lecture 8

In the previous lecture we talked about the process of skill development. As you remember, the internal process of skill development with learners is a transformation of the unfolded and distinctive units of an action into one indivisible process. After the action units merge, the learner performs the action in the following way: first, he recognises the situation and performs the action according to the image of the action developed earlier. Physiologists call this process acceptance of the action. From a psychological perspective, we call it the development of an image or a model of the action. When the model of the action has been developed with learners, the action flows as one indivisible process and the learners do not slow down in the places where the transfer from one unit to another happened previously. Once the required rhythm of the action is established (the speed of the performance of the action in its individual units), and the action has been completely mastered by the learners, the tempo of the action (the speed of the performance of the whole action) may be increased.

It is important to emphasise that skill development is not a process of memorising the action's structure, with its subsequent repeating and improving. This is a very mechanistic understanding of the process that prevailed in researchers' minds until we learned of a more subtle structure of the process of skill development. When learners engage in skill development, these skills undergo transformations and changes. This

process is time-consuming, when the learners should give this time for the transformation to happen. The worst approach is to attempt to develop a skill with learners according to the given model of that skill in a very short time. Such an approach may actually hinder the development of true skills with learners. We should remember that skill development is a transformational process that can be developed gradually with learners. During such a transformation, the action performed by the learners undergoes considerable changes.

The process of action development may happen in the following phases: first, a model of the action has to be identified and presented to the learner, and second, this model should be divided into individual, manageable units. Specific characteristics should be identified for each unit, with these characteristics forming a so-called secondary structure. The secondary structure has to be recognised by the learner when analysing the situation in each of the units. The secondary structure assists the learner in performing the action. Correspondingly, the characteristics of the whole action form the action's primary structure, which also has to be presented to the learners when the action is first introduced. The primary structure is particularly important when the individual action units have been mastered and the learners perform the whole action. Only then can the action be automated by learners.

The process of action automation is based on the development of conditional relationships. This is a very general understanding which is correct, although insufficient to understand how and where these conditional relationships should be developed. The development of conditional relationships is often understood as a process of stereotyping the action by monotonously repeating it. This is true, though stereotyping can also be established in two different ways: either by monotonously repeating the action, or by identifying common parts of different actions. The second approach is more beneficial, because the first is limited by the conditions of the action and the action developed by the first approach has very limited areas of application.

If we stereotype the action by identifying common parts in several actions, then such an action can be applied in many other circumstances and situations. In practice, stereotyping individual actions is impossible. This is because the conditions of the action cannot be identical, nor can the learners who engage in this action. There is always variation in the action's conditions, or among the learners who engage in the action.

We can conclude that stereotyping by identifying a common part in several actions is beneficial for the learners. However, I warn you of a very common mistake: teachers often aim to develop so-called automated skills with learners, the skills that learners can perform automatically without thinking. This is achieved by reducing the number of situations the action is applied in. Therefore, the skills are developed only in the most common situations. Still, such skills are not of the best quality, so to say, and as I have already mentioned, they have very limited areas of application. In fact, it is not more complicated to develop skills by following the second approach: identifying a common part in several actions. The benefit of such an approach is that the developed skills can be applied in various situations. Therefore, we have to introduce to the learner the whole set of situations where these skills may be applied. Such an approach creates positive premises for maximum generalisation of these

skills, and shows the areas of the application of these skills. If following the opposite procedure—first developing skills in particular situations, and then attempting to transfer these skills to other situations—learners often struggle and we face the need to retrain or re-educate them, which is often time- and effort-consuming—indeed, much more time- and effort-consuming than initial training. To sum, the stereotypes required for establishing conditional relationships should be developed using an action's generalised basis.

However, while it is important to single out an action's generalised basis, it might be challenging for learners to apply the generalised action in various situations in which specific conditions should be accounted for. Such an ability to adjust the skill for specific conditions is defined as skill flexibility. In other words, it is important for learners to be able to apply the generalised skills in various familiar and unfamiliar situations. But how can we ensure such skill flexibility?

We can start developing skill flexibility in the orienting part of the action, which is developed with learners at the very beginning of the action. In the orienting part, the learners are introduced to the main conditions, circumstances and situations where the target skills may be applied. We can do so in the following process, as opposed to the generalising process: first, we identify the generalised basis of an action (skill), and then introduce the types of tasks, circumstances and situations where such a skill may be applied. We do not need to include all situations, though the learners should be introduced to the types of tasks or situations where the target skill may be applied.

If we select the types of tasks and situations and introduce them to the learners, in doing so, we can prepare the learners to apply the developed skill and action in different situations. When a learner meets a new situation, the action/skill will be performed at a slower pace at the beginning; however, the learner will be able to perform the action in the new circumstances. To conclude, skill flexibility (automated action) is achieved when it can be applied by the learner in various tasks, situations and circumstances.

Two more remarks about skill development. First, when action automation happens, the learner does not need to examine the situation, but he recognises the situation that has been introduced previously. The control of the learners' action performance happens by comparing the action's flow with the image of the action developed with the learner. In physiology, this is called correlation of the performed action with its imaginary model. Second, even the most automated action or skill does not "fall out" of the human mind, as it may seem during self-observation. This action is still present in the mind, albeit in a different form. In an automated action, the detailed orientation of the learner is substituted by the recognition of the situation and comparing its specific factors or circumstances with the action's generalised orientation. In addition, control of the action's performance happens by comparing the actual flow of the action with its imaginary model. This can be well-illustrated by the work of a machinery operator who analyses signals from the lights on the dashboard. Yet, the operator is not just dealing with signals: he understands that each signal symbolises a specific process. Therefore, when receiving a signal, the operator can interfere in the process that requires his assistance. However, if all the dashboard lights are green, then the process can flow by itself and interference is not required.

It should be mentioned that we, in fact, exercise “the automated process” with regards to our health. Our life processes are also automated, and our minds receive signals informing us if these processes flow successfully or require our (or a doctor’s) interference. Similarly, as we control the processes in our bodies, we can control the processes outside our bodies, and even an automated action remains an action we perform. This is important to realise, as it supports our considerations that machines cannot substitute people. A machine is only a constituent part of a human action. This is applied to any machines or technology and we, as people, only manage processes by using an advanced control system.

Automation means that a device can control action performance, and that we can develop such a device in ourselves. Such a device performs both an action’s orienting and executive parts, so a person does not need to perform the action himself. In doing so, the performed action connects the person with the action’s final outcome. The person does not need to think about how to perform the automated action; the purpose is just to achieve the action’s final outcome.

An action can be characterised by its expressiveness, although sometimes the expressiveness of the action appears to be rather ridiculous. For example, when people of vocational (blue collar) professions are invited to speak on the radio, it appears to be extremely difficult for them to speak and express their thoughts orally. Their speech is often indistinctive and difficult to follow, because talking, for them, is a new and largely unknown task. Children, on the other hand, are very expressive when they talk. Without thinking, children speak freely and with much expression. You have to be either a child or an actor to master the art of expressive speech. Until you have mastered the action (e.g. to speak expressively), it can be described as a connecting link between the person and the action’s final outcome, with all your attention focused on this link in the middle. However, once you have mastered the action, you do not need to focus on the action itself, as the action happens automatically; what becomes of primary importance is the action’s final outcome. Only then can the so-called expressiveness of the action becomes visible.

At the end of the 1920s a remarkable German psychiatrist wrote an article that was published in the *Journal of Psychiatry* and devoted to the topic of psychology; therefore, the article remained unnoticed by both psychiatrists and psychologists. The article was about “the inner pose”, which was explained as the highest form of all automated processes. The inner pose was defined as an attitude of the person towards the action he/she is engaged in. This attitude is established involuntarily and manifests itself in the way the person acts. For example, when a person talks on the phone, even if the person is totally alone, he makes some expressive gestures to support his or her speech. However, since the person on the other end of the line cannot see these gestures, what is the point of making them? Gesturing happens because it is difficult for the talking person not to show his or her attitude to the conversation and he or she does so by mimicking, gesturing, etc. The talking person simultaneously expresses his/her attitude on what he/she is talking about. This is what we call “the inner pose”—an attitude of the person towards what he/she is doing. This attitude does not reflect if the action is being performed correctly or it achieves its desired outcome, but instead the significance of the action is in achieving the far

or near goal. When the action becomes automated, then the action may achieve its expressiveness.

Action expressiveness has a double meaning: first, it is directed to the outside world, and second, it connects the acting person with other people. Animals have a large number of inborn expressive movements that have important defensive and adapting significance. For example, when an animal wants to make a deep impression on another animal, it takes a defensive pose, which might frighten the enemy. During the evolutionary process, animals have developed a great number of automatic mechanisms to demonstrate frightening poses, and sometimes take these poses without even understanding the purpose of such an action. The animals that can take such poses have better chances for survival. To summarise, expressive movements are of primary importance, and are always directed at objects in the outside world.

However, an acting person may also direct expressive movements at himself. For example, I have seen a person who huffed when chopping wood. I thought, why is he puffing if this does not affect the log or the axe? It turned out that this puffing materialised the person's orientation in the action. Only an unawared person may think that chopping wood is an easy job. This is actually a complicated action that requires much thinking, about the shape and the structure of the log, where the circles and the knots are, how to strike the axe at the right angle so that the log will split properly, etc. So, when this person puffs, he is saying, do it in such and such way. He identifies where to hit and confirms his orientation by puffing and, in doing so, the expressiveness is of primary importance not for the surrounding people, but for the acting person himself. In addition, such expressiveness simplifies the task for the acting person, though it also reveals the orientation of the acting person. If you would like to disguise your orientation from other people, you should not demonstrate your expressiveness. In fact, some people should be trained not to demonstrate their expressiveness openly at all.

At this point we finish our examination of the process of the development of actions with humans. As you remember, we started from the inner actions, or actions that can be transferred to the inner plane of the learner as mental actions. Then, we examined the actions that remain on the external plane, but that transform into ideal actions (ideal actions of seeing, listening, etc.). After that, we discussed how these actions are accompanied by the development of sensory images of surrounding objects, and how we develop our conceptual understanding about the surrounding world. Finally, we studied the development of physical actions, where the executive part of the action develops as a physical interaction of a person with appropriate tools. In the following lectures we will talk about the psychological grounds of attention, thinking and creative thinking. We will also touch upon the psychological grounds of memory, dreams, feelings and will.

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