An Appraisal of Cognitive Skills Acquired Through a Culinary Program While Using the Instructional Methods of In Vivo and Video Modelling

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Abstract: The study focuses on what helps improve learning for people with intellectual disabilities. Participants participated in a research project that consisted in a cooking programme that is a part of the independent living programme. During this study, the participants conducted five different cooking sessions to learn about cooking. The participants were informed that they will also be assessed formatively for cognitive skills that are learnt through the lifespan of the cooking programme. The cooking component is a part of the overall programme that prepares people with intellectual disabilities for future employment, some of whom also choose the hospitality sector.

The study set out to conduct a pretest-posttest type of experimental study where learners underwent a five-part cooking programme via the instructional methods of in vivo and video modelling. The participants were then asked to complete the task at home by themselves with the use of the video that had been recorded in class. Participants were also asked to present their work at the following session. After each recipe was completed, the participants were asked to reflect on their cooking journey via a form that was filled in online. As with pretest and posttest experiments, the participants were assessed before the experiment and were asked to fill in a similar form questioning them about whether their cognitive skills improved over the course of the five sessions by the end of the project.

The results showed that there are a number of aids and barriers when completing tasks. Furthermore, having a personal instructor and the use of video were the preferred forms of learning among this study group. Following visual instructions was also perceived to ameliorate the learning experience of people with intellectual disabilities. Another aspect of learning that emerged was learning that occurred through the use of the different senses. Seeing and listening to the videos with the possibility of fuller control as to when to start, stop or repeat the video also helped. Tasting and smelling the food gave more control too because the results were more tangible.

Introduction

Article 19 of the United Nations Convention on the Rights of Persons with Disabilities states clearly that all persons with a disability have “the equal right to live in the community, with choices equal to others, and shall take effective and appropriate measures to facilitate full enjoyment by persons with disabilities of this right and their full inclusion and participation in the community” (Article 19 – Living independently and being included in the community | United Nations Enable, 2022). This means that a disabled person should be assumed to have legal capacity and not be requested to prove that they have this capacity to make their own choices unless they have been placed under an interdiction/incapacitation/plenary guardianship order. Malta has ratified the convention and is obliged to abide by its requirements. The UNCRPD is now also part of Maltese legislation.
Having an intellectual disability means limitations in executive functions. These include limitation with regard to working memory, cognitive flexibility, and inhibitory control (Diamond 2013). Programmes aimed at educating students are more commonly concerned with acquiring the skills obtained throughout the course of a programme to be more job-ready and as such better qualified. Generally speaking, vocational education programmes at post-secondary level are more concerned with answering to industry needs, and industry is more concerned with profits. Given this, the idea of attaining a level playing field for independent lifestyles is jeopardized right from the start, since the level of entry into the real world does not begin with the wellbeing of the person, but rather with the intellectual capability that the apprentice ought to have so as to be considered fit for work or not.

Furthermore, by looking at the social and behavioral elements of learning as is more commonly done in mainstream education in Malta, the chances for people with disability to compete with their counterparts are already automatically outmatched by ‘normal’ people who from the start already possess the level of cognitive ability required to satisfy the completion of certain tasks using the core executive functions. Academic programmes are mostly concerned with intellectual capability and assessed via the method of assignments and tests that qualify the performance—or not—of a student based on their competence at achieving the milestones set out in the course’s programme.

Competence is the result of having grasped the knowledge and skills to complete a task. A conscious effort is required to improve the learning experience of people with disabilities. In a learning environment, adult learning requires self-learning. Given the limitations in executive functioning of people with disabilities, a conscious effort is required to provide people with disabilities the chance to improve their learning skills and to find ways to go beyond what they already know, so as to reach better and higher levels of education. In the absence of learning strategies for people with disabilities to improve their level of studies, and so their cognitive functioning, people with disabilities face an added challenge to outperform even themselves, if the method of instruction for improving cognitive skills during learning is lacking.

Simplifying notes and simply adhering to the universal design for learning and any other technological aid is enough to facilitate the learning of people with intellectual disabilities. Though this is of benefit, cognitive skills are seldom assessed in order to improve the learning of students and to better the chances of persons with intellectual disabilities to reach higher levels of education. With this approach, education may not result in improving the learning experience of people with intellectual disabilities, since cognitive learning skills are seldom prioritized as a key function or as a measure of assessment (and so of improvement) of the learning process. Furthermore, persons with intellectual disability tend to be amongst the most silent group of persons in any society and so participation in independent living programmes is a golden opportunity to enable them to have a voice and a chance at enjoying the benefits of what it means to live a fully independent life.

A significant component of specially designed courses for educational purposes is independent living skills. In special education programmes, such as the vocational skills Intro A and Intro B courses for persons with mild to moderate intellectual disabilities at MCAST, independence is promoted via the learning of skills like employability skills, decision making, budgeting skills, and problem solving.

One daily activity which uses each of these skills is cooking. The ability to handle, prepare, and store food safely for people with intellectual disabilities is a critical independent living skill. Furthermore, culinary skills are skills that learners with mild to moderate disabilities may practice at their potential place of work, thus encouraging the use of this skill as a financial means towards independent living and wellbeing. It is the intention of this paper...
to demonstrate that cognitive learning takes place while learning culinary skills by carrying out simple culinary tasks.

By learning about cooking, learners also become more sensitive to the world around them. Becoming more culturally sensitive and open to other cultures through the choice of foods eaten and through the limitations of eating imposed by some cultures and religions. Enjoying other food cultures is not only about limitations, but also about opportunities to learn about new ingredients, how they are used, and the integration of these ingredients into one’s own cultural cuisine. Sharing cultures is one way to open to other people. Through this culinary programme, learners will also learn about healthy eating, where healthy food will not simply mean losing weight but will, more importantly, mean a healthy lifestyle while eating tasty food. Learning about healthy eating is a way to move away from health problems that the Maltese especially face, such as obesity, diabetes, and other non-communicable diseases. A good culinary programme will teach them that healthy food can be decent food. Many cooks and chefs today promote the idea that tasty food is healthy food; this is one reason many chefs are turning to vegan, vegetarian, and pescatarian options for their menu.

A variety of strategies are known to be effective at teaching cooking skills to persons with intellectual disabilities, with in vivo teaching and video modelling ranking among the most effective (Bates, Geiger, Dillon and Leblan 2010; Charlop, Le and Freeman 2000; Day 2015). This suggests that video modelling may be an effective instructional technique for teaching meal preparation skills to individuals with moderate or severe disabilities (Park, Bouke, and Duenas 2019). According to Surgenor et al. (2017), the use of video modelling for teaching culinary skills has the advantages of generating engagement and creating more control over the pace of involvement, thus allowing for more time to process the information being received. Furthermore, in their findings from studies consisting of 21 various instructional methods, Gilson, Carter and Biggs (2017) found that technology-assisted learning ranked among the top four teaching methods. Surgenor, Hollywood, and Furey et al. (2017) studied how the role of video technology impacts learning, more specifically, the development of higher technical cooking skills. They found that video technology can boost confidence in learning culinary skills in the following ways: (1) improved comprehension of the cooking process; (2) real-time reassurance in the cooking process; (3) assisting the acquisition of new cooking skills; and (4) enhancing the enjoyment of the cooking process. In addition, in a study carried out with five children with autism aged between 7-11, Charlop, Le and Freeman (2000) found that video modelling among children improved repetitiveness of the activity in video modelling but could not be generalized for in vivo modelling, thus concluding that video modelling is superior for teaching new behaviors.

By using the above two instructional methods of teaching cooking skills, the researcher set out to assess what cognitive skills would be more effectively used to complete the tasks that had been assigned to the participants, which happened to be tasks involving the preparation of food. With this in mind, the researcher set out with the research questions: ‘How does the in vivo method and video modelling in a culinary programme benefit people with an intellectual disability to improve their cognitive skills?’ and ‘what can be learned about teaching strategies for people with intellectual disabilities to improve their chances of graduating to higher levels of learning within the educational system in Malta?’
Methodology

The Purpose

The purpose of this study is to see whether the participant’s cognitive skills (dependent variable) would help them become more independent at cooking through the implementation of a five-part cooking programme (medium) using an in vivo method of instruction and the video modelling method of instruction (independent variables). According to Kanfush & Jash (2019) these methods of instruction are becoming an increasingly more recognized method for instructing persons with intellectual disabilities.

The second objective was to ascertain whether educators could help improve the chances of people with intellectual disabilities to graduate at higher levels of the Malta qualification framework by tweaking certain aspects of instructional programmes by giving priority to cognitive skills for learning, to achieve better outcomes during formal educational programmes.

Research Philosophy

The use of an interpretivist approach was adopted in this research. In this approach it is understood that meaning is made up from the participant’s subjective understanding of the situation, by studying the phenomenon occurring in the participant’s natural environment, and considering that every participant could make up meaning to their own reality.

Research Approach

The study made use of a deductive research approach. The exercise began with a top-down (deductive) thematic analysis about aspects of cognitive skills to see how the participants faired prior to the intervention and whether there was any improvement after the intervention, i.e. the cooking instruction programme.

Another set of data was collected in the form of a survey answered using MS Forms, where the participants kept a track record of their cooking journey. Some parts of the data from this form, which were sentences or paragraphs written by the participants were then analyzed using the the MAXQDA 2020 software to elicit themes that emerged. This was the inductive part of the study. Overall, the responses form this cooking journal served as data to substantiate the learning that occurred while participating in the research study. A visual representation of it could be found in Figure 1.
Population of the Study

The student population, was made up of those students attending the Independent living programmes, namely the Introduction to Vocational Skills A and Introduction to Vocational Skills B levels, as found on the Certificate for Vocational Skills Levels A and B of the Malta Qualification Framework Manual. They were all selected to participate, as this was a part of their coursework. The research project had six (6) people with disabilities taking part and random sampling was not applied, since all students following the program were a part of the treatment group.

Research Design

This experiment made use of a pretest-posttest single group design. The task made use of a cooking programme as a medium to facilitate the learning of the students and used different learning styles to carry out this learning. Prior to carrying out the practical cooking task at home students were informed about the preparation of the recipe through a practical demonstration of the recipe to be cooked at home, theory about food preparation methods to be used in that recipe, together with visuals to aid in the different key steps required to carry out tasks, and finally filling in worksheets. This was to facilitate the learning process so that, using Universal Design as the learning method before completing the cooking session at home (UDL: The UDL Guidelines, 2022) could be put into practice. However, it was the aim of this research to appraise learning via the method of In vivo teaching and video modelling, with a particular focus on cognitive skills. The experiment has as its main objective the learning of culinary skills. The researcher could better understand whether the instructional methods facilitated learning by focusing on cognitive skills.

The participants were first instructed in class via the use of a face-to-face cooking demonstration class during which the students observed and interacted with the lesson through discussing theoretical components along with the skills that were going to be implemented during that session. The cooking sessions were recorded using a laptop and the application MS Teams so that the students could refer to the recording afterwards. When the students went home, they were given a week to complete the same recipe by cooking it at home. They had the recorded session of the demonstration cooking class available to them to follow instructions and to complete their task.
Data Collection and Analysis

In the pretest phase, a survey was administered to score their cognitive skill awareness as they perceived their level of knowledge and skill in cooking prior to administering the intervention. After the course of five cooking sessions, the participants were then asked to fill in a self-administered survey with questions relating to their ability to manage, process, and execute tasks after having received the treatment, the cooking programme. Throughout the programme, the participants also made use of self-administered surveys to record their learning journey. The importance of this was to refresh the memory of the participants after each cooking session and to facilitate the learning that had occurred making use of the Universal design for learning principles, that of representation, of multiple means of action and of expression and of engagement (UDL: The UDL Guidelines, 2022). The data was then analyzed using a thematic approach. This method of data analysis is a “straightforward general approach which can be used in a wide variety of settings” (Robson 2011: 468).

Limitations

Considering that the design only made use of a treatment group, this could be seen as a weakness in the study because of the risks incurred that make such design “vulnerable to many threats to validity” (Robson, 2011, p.112). To compensate for this, a cooking journal was kept over the course of the program so that the participants themselves recorded what learning was ongoing, and therefore, it could be better understood what skills were learnt throughout the program and as a result of the cooking intervention.

Findings and Discussion

The following findings will be related to a discussion about 1), a description and analysis of how the instructional methods of in vivo learning and video modelling helped the learning that occurred in the different dimensions of cognitive learning and 2) how knowledge in culinary skills was acquired through the five sessions during which the culinary skills programme for independent cooking occurred

Cognitive Skills

Sustained Attention

Initially, students were asked to state whether it was true or not that they struggle to complete tasks because following different steps could pose them some problems. The pretest reaction had three (3) participants answering in the affirmative, noting that they struggle to follow steps—in this case to follow recipes—even when they have a step-by-step guide. After the intervention took place, the students were then asked to rate the learning that occurred, with five (5) participants responding in the affirmative that following the videos to complete their cooking tasks was beneficial to keep their attention focused on the task at hand. One (1) voted negative in both instances, stating that neither were there problems with completing a task by following instructional steps, nor was the instructional method of video modelling helpful in learning culinary skills. Nevertheless, throughout the rest of the self-administered questionanaire, the same participant showed that video modelling and the in vivo method of instruction helped on several fronts, such as learning styles and sensorial preferences of learning. Overall, it could be said that the participants were better able to learn while being helped through the use of the instructional methods of in vivo cooking during demonstration classes and the video modelling method of instruction.
Selective Attention

For the pretest, participants were asked to list any hindrances they find to learning. They were given the option of choosing more than one hindrance from a list. The following were the results from the pretest. One (1) said that they find it disturbing when people talk to them while they are carrying out a task; four (4) participants claimed that when they lack guidance, their learning is also impeded; two (2) participants stated that they feel distracted when they hear noises around them; another two (2) participants said that they lose focus when they are distracted by other thoughts; while one (1) participant said that they are impeded from completing a task when the task at hand is too difficult. Five (5) participants also claimed to have successfully completed tasks through the methods of instruction used, with the same participant who stated that they are disturbed when there is intrusion from another person also stating that they were unsuccessful at completing the tasks without too much distraction.

The latter could indicate that, independent of the instructional method, distractions still prevented the participant from completing tasks. Below is a table with the results.

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**Figure 2: Reasons for getting distracted while learning**

### Divided Attention

Five (5) participants agreed that they normally make more mistakes when the task at hand is more complex and that that would require several steps to complete. One (1) participant disagreed with this statement, with the same participant agreeing in the posttest that the videos were facilitating the process. A different participant who claimed that mistakes are made due to complex tasks or through multitasking said that the videos were not helping to overcome this problem. A plausible explanation could be that the recording on the video was not explicit enough to demonstrate that two different processes were simultaneously occurring and, consequently, the video recording could have been insufficient to facilitate learning more complex tasks due to either things not having been edited or possibly due to the fact that not all processes included in the completion of the task were clear in the
video. That being said, it could be that the task at hand was still too complex to achieve since this comment was made about a recipe that required multiple complex processes to be occurring at the same time. In this case, reference is made to two or more processes happening simultaneously, such as boiling a pot of pasta while creating a sauce, with both pots on the hob at the same time. It appears that the demonstration class with in vivo instruction and the video modelling did not facilitate learning when it came to the participant being better at managing more complex tasks. To this end, agency is required for executive functioning. According to Timpe (2016) agency “is typically taken to involve the ability to respond to reasons and to guide or control one’s behaviors in light of those reasons” (p. 769). Using this line of thought, what appears to have happened is that, due to the disabilities of this participant the agency to complete the task that required more complex management, impeded the participant from choosing the right course of action and consequently ended up not managing the task.

Long-term Memory

Regarding long-term memory, three (3) participants did not feel like they struggled to solve problems when they had written instructions in front of them, while three (3) said that following steps from written instructions is an obstacle to learning. Nevertheless, in the posttest, all the participants’ six (6) showed that the in vivo method of instruction helped them with learning when it came to trying out the recipes at home.

Visual aids, such as pictures of the required tools, or displaying the tools and ingredients required for cooking that were presented in the recorded videos and during the demonstration session, proved to be a necessary step in helping the students properly prepare for the task at hand by not forgetting anything. Six (6) of the participants indicated a preference for more practical rather than abstract presentation methods, since a lack of visibility requires more complex thought and mental planning, thus hindering the successful completion of tasks. When steps, tools, or ingredients are not all visible, this could result in the failure to complete the tasks successfully.

Using the videos and following the recipe using a step-by-step visual guide to carry out the task resulted in a confirmation of what the participants had already claimed at the beginning of the study, where they asserted that the practical was more desirable than the abstract for successful completion of the task at hand. The results showed that all participants stated that the chances of getting lost in the process of completing the task is less when things are visible to them.

Short-term Memory

Visual aids also helped in the learning process because tasks were broken down into their constituent parts and this helped in facilitating the logical steps needed to complete the tasks. This aided the participants with not forgetting anything, be it an ingredient or a key step in completing the recipe. A written format may consequently make it more difficult for participants to complete the tasks. Although all six (6) participants agreed with this, in an earlier statement half of them had said that written instructions do not impede the problem-solving process; however, the same participants also said that despite the fact that written instruction may not be a hindrance, they still thought that visual instructions are simpler to follow. Once again, in the posttest all six (6) participants agreed that videos are easier when it came to following instructions one step at a time. On the use of video modelling, half the participants stated that they watched the video once through and completed the task, while the other half required a second viewing.
Logic and Reasoning

Guidance in the form of a tutor is needed and all six (6) participants agreed to this. Coaching for people with intellectual disabilities is a widely accepted practice that helps builds self-determination. Lave and Wagner (1991) use the term ‘communities of practice’ as a form of situated learning, where students take the passenger seat and learn from mentors until they too can become fully included and participative citizens. In the posttest, five (5) participants agreed that they fared better with guidance, while only one (1) abstained.

Auditory Processing

Using the senses—this time of listening—also seemed to play a significant role. Hearing instructions in addition to seeing tasks being carried out proved to be important for the participants. Four (4) participants claimed that sounds, like sounds made by foods while cooking or the sounds of equipment when they are powered on and ready for use, as well as listening to instructions, enhanced the learning process. Two (2) participants were not in favor of making use of this sense prior to the cooking sessions, while after the cooking sessions all six (6) participants were all in favor of making use of the auditory and visual senses as an asset for completing the task at hand.

Visual Processing

Prior to the experiment, six (6) participants reconfirmed the importance of visuals to facilitate the learning process. These visuals consisted of a video (using the video modelling method of instruction) rather than pictures because by watching the video the participants were able to check where in the process they were and whether they were carrying out the tasks correctly or not. Asked again about the use of video tutorials, all participants confirmed this method of instruction as being beneficial for their learning. Therefore, here the claim being made is that with the use of video tutorials students were better able to learn since they have a tough time learning things through only reading about them.

Processing Speed

For this last and final tenet of cognitive learning skills, students had a mixed opinion on the matter. Three (3) acknowledged that they do have a problem with regulating their learning, finding it more difficult to keep up in class, with the consequence being that of not completing their tasks due to insufficient time in class to do so, while the other three (3) do not feel the speed at which they work to be an issue for them when working in groups. Overall, even for those who did not acknowledge that there was a problem with the speed at which they learn and complete tasks, five (5) still stated that these cooking sessions have boosted their confidence in cooking. One participant, who acknowledged that there is a problem with the speed at which he learns in a group, and who asserted that being in the comfort of home away from group peer pressure yields positive results, still did not find that the overall cooking experience boosted his confidence in cooking.

Results from the Culinary Journal

While both methods of instruction have proven to enhance the cognitive skills of persons with intellectual disabilities, it is most noteworthy to highlight that those persons with intellectual disabilities in the group preferred this method of instruction over the more traditional method of teaching, i.e. reading of notes. This method of instruction also contributes to the UDL method of learning, where people learn differently, with audio-visual learning being a part of the different domains of UDL.
Making use of the Senses

To answer the questions in the survey, the students were given different options to choose from so as to illustrate which of the senses were most engaged with their finished product. The criteria of ‘Tasted good’, hereinafter referred to by the letter (T), ‘Looked good’, hereinafter referred to by the letter (L), and ‘Smelt good’, hereinafter referred to by the letter (S), or a combination of all, as the students were given the option of multiple choice, were used to express how each of the five (5) dishes appeared. For most of the students, all senses were enticed by their own cooking. Where N=30 responses 63.33% (N=19) responded using all three criterion to describe their food, three (3) responded that taste stood out from among the other senses, one (1) mentioned smell as the main characteristic of the finished dish, two (2) rated their food as being more identifiable from taste and smell, another two (2) that it was more attractive to look at, and the final two (2) said that the appearance and smell of the food stood out.

![Figure 3: Using the senses to judge the completed dish](image)

One goal of asking the question above was to find out how highly they rated the finished product. Food likeableness is a subjective aspect to measure and, although there is respondent bias, especially since it is a self-administered survey, this still gives us an idea as to whether the dish was generally likeable or not. 93% of students rated their food between 4-5 out of 5, with an average rating of 4.75.

Using the senses, at least for instruction of culinary skills, also proved to be effective in most cases of the participants who were asked about the different senses used. While UDL already promotes using the different senses, like listening (hearing) and seeing (reading) when teaching culinary skills, other senses may also be incorporated into the teaching method to accentuate the use of other senses which are necessary while cooking (e.g. smell). The saying ‘we eat first with our sight’ is on point, since learners with disabilities, in their surge for independence, will be able to present food on a plate which is attractive to the eye. Taste and scent are the next two senses that have to be satisfied when eating a meal. When cooking for friends and family, persons with intellectual disabilities will learn the importance of the different feelings and responses caused by the scent and taste of food. Enjoying the aromas, tastes, textures, and colours that food has to offer makes nutrition and healthy eating easier to be taught to children, especially to those who may be facing obesity issues. By learning culinary arts, one can learn to enjoy food as a pleasurable art as well as for its essential nourishment. Teaching learners with intellectual disabilities culinary skills also prepares them to enjoy cooking for their friends and family and so provides them the skills to develop and prepare new meals, to manage their resources properly, and teaches them how to keep their place of work or home clean and hygienic.
Cooking Skills

Among the six (6) participants and over the stretch of the five (5) cooking sessions, the participants practiced 7 different skills for a total of 94 times. Students were able to choose more than one skill to practice per recipe and so the results showed that each student was using different skills per each recipe that they cooked. The skills that were practiced depended on what the recipe called for. The skills were practiced since, during the theoretical component, the lecturer would explain the practicalities of the skill, what tool to use, what the key steps to completing the skill are and even safety measures needed to ensure a hazard-free activity. This was also facilitated by watching the video to see how to complete the skill, which was recorded during the in vivo session and which the participants had available to them from the comfort of their own home. To complete the teaching task, students were also given a PowerPoint presentation of the skills required in their cooking session and which displayed the written content of what had been explained in class. Skills such as peeling, washing different vegetables, and cleaning surfaces were among the theory they were instructed in.

Figure 4: Food preparation skills practiced
Cooking Methods

This time, the number of different cooking methods practiced was recorded as it is another key component of food production. Being presented with more safety hazards—since there is the element of heat and electricity involved—students were instructed in the theoretical components prior to carrying out any cooking tasks. In addition, participants who were available for the in vivo demonstration cooking session were also presented with a video of the cooking session that had been recorded and with a set of notes and handouts on how to safely carry out the task at hand. The results show that the students were able to practice four (4) different basic cooking methods for a total of 37 times.

![Figure 5: Cooking methods](image)

Health and Safety

Health

Health and safety topics were covered, with themes such as what foods are best to buy among fresh, frozen, and canned, the healthy eating plate, and seasons of local produce. From the survey it resulted that 60% (N=29) of the respondents answered that fresh ingredients had to be used for the recipes that were being cooked; 57% (N=30) also answered that the chances of getting fresh food for the recipe at hand with ‘maybe’, which indicates that when 100% (N=30) answered ‘high’ with respect to the quality of the food result for the food that they produced, they might not have been giving all that much attention to the health factor of buying local and seasonal produce, since while only 10% (N=30) of the recipes cooked by the participants could not be fresh, the other 57% were uncertain, which presumably meant that they were not sure if it was fresh or not.
Safety

Safety was high on the teaching agenda. Students had been well-informed about the different dangers that they are presented with in a kitchen, namely, heat, electricity, and sharp objects. Basic knife skills and how to set up to avoid safety hazards were presented throughout each session, with every session beginning with the basic tenets of safely preparing food. Once again, the theoretical component was given priority by giving PowerPoint presentations to students. Possibly because of COVID-19, students may have given more priority to the washing of hands; however, generally speaking, participants gave satisfactory attention to the other essential elements of safety when preparing food.

Students displayed a willingness to practice their cooking safely and suggested several ways as to how to do this. From the responses, it was evident that students are more independent since they are more attentive to the safety hazards that can be found in a kitchen environment and are better equipped to take the necessary measures to prevent accidents from happening. From the responses, it was also clear that the students showed an overall understanding that time and temperature are essential elements to check when cooking food so as to ensure safety. One participant stated that the bacon must be cooked less, suggesting that judging by the bacon's appearance, it might have been overcooked; however, whether this was due to keeping the bacon on the heat for too long or due to the bacon being cooked over too high a heat (causing the Maillard effect to reach higher temperatures than is required), is unknown.

To cook the hash browns a little bit more.

Another participant remembered the importance of timing his food for it not to get burnt.

Use a timer when cooking burgers in an oven.

While other participants focused more on health and safety elements, such as working in a clean place and working safely, one participant noted the following:

Place a wet napkin under the chopping board, halve the onion so that it will not wobble, and leave the roots on for easy chopping.
Cooking with a Budget

Cooking with a budget allows for more economical use of food. This is not always easy given that healthier products usually cost more and may be more problematic to come by. Locally, organic farms are more likely to be found in the northern part of Malta, and most of the participants came from the southern part of the island. From the responses given about how to save money when cooking a dish, the majority felt that it entailed compromising quality. For example, changing freshly ground meat to corned beef was an example of a more economical choice when cooking. These are the results of a willingness to be more economical when making consumer choices about food.

![Figure 7: Are there means of saving money while cooking?](image)

However, the next question, which was related to economic buying approaches, required the participants to fill in the text required if they had answered with a ‘yes’ to the previous question. Most answers received in the survey might not even result in saving money, although this is debatable since, sometimes, the market prices would—due to economies of scale—cost cheaper than if one were to buy the products themself and make an ingredient from scratch (e.g. pizza dough). Then again, if one is seeking quality, say for example knowing what meat is being placed in a burger, it might be more expensive than if one were to buy a highly processed meat burger from off a shelf; however, once again, quality is being compromised. Other responses included using less ingredients and exchanging ingredients, say switching mushrooms with a tomato, since a tomato would cost less. However, for the sake of being more economical in cooking, using storage methods such as freezing prepared foods for later, or cooking in bulk and then freezing, or buying local produce when it is in harvest, and either preparing a sauce with it, or preserving fresh products for the time when the fresh ingredient is not in stock, would have been more adequate at saving money while still retaining quality in the food they eat.
Figure 8 illustrates the keenness on learning the ‘tricks of the trade’, with a further description of the comments that were left by the participants in Figure 9 below. As we progressed through the sessions, the lecturer was imparting knowledge about skills that would enhance the cooking experience, making it a safer experience for the learner. As can be seen, the word that was highlighted the most was cooking procedures, with students placing their attention on getting things right by following steps and instructions to complete their work. Participants also found the mastery of the timing of food to be important in order for the finished product to be of a satisfactory level. The theme of safety also kept surfacing with safe practices being seen as the basis for more independence in the kitchen. On the other hand, as a way forward, other important cooking elements such as internal temperatures and other more complex cooking methods would be a next step in the learning journey of these students, however, this would be possible only once these more basic tenets have been mastered.

![Figure 8: The codes according to the code system configurated by use of the MAXQDA 2020 software.](image-url)
An appraisal of cognitive skills acquired through a culinary program while using the instructional methods of in vivo and video modelling

Figure 9: Learning Curve - comments that reflect what has been learnt
Student Feedback

After all five sessions were completed, the participants were asked to fill in a final feedback form, this time about the culinary skills learnt through the various forms of input that were provided along the way with varying frequencies.

Figure 10 illustrates that, throughout the culinary experiment, 100% of participants (N=5) responded positively to learning a variety of skills so as to be more independent in cooking. The same participant that marked feeling only somewhat more independent in cooking after completing the cooking programme did not fill in the table of culinary skills learnt during the experiment.

![Figure 10: Culinary Skills learnt](image)

The culinary skills that were being taught had notes and videos presented with them, so the in vivo teaching instruction method also had a theoretical part added to it. In the demonstration kitchen, the skills being repeatedly used were also explicitly explained by highlighting the key steps to execute the skills successfully. What is clear from the feedback given by the participants is that the skills that were put into practice during the cooking programme were successfully learnt throughout the course of this programme.
Figure 11 indicating that 100% (N=6) of participants answered this part of the survey, shows that only one of the participants answered ‘somewhat satisfactory’ with respect to the course being helpful for knowing more about healthy eating, about feeling safe when using electrical appliances, and finally about feeling more independent in the kitchen.

Figure 11: Participant feedback on culinary skills attained

Conclusion

Education is one of the more concerning areas of growth for persons with disabilities and equal opportunities (CRPD 2018) and Malta has one of the fastest-growing populations of persons being statemented in schools. One of the main priorities of educators is to provide equal access to all, thereby giving a fair learning chance to all learners. With the expansion of many programmes in Malta, the need for educational programmes targeting culinary skills for persons with disabilities grows too.

The effectiveness that such culinary programmes have on the learning and acquisition of cognitive skills for persons with disabilities encourages me to propose that, eventually, Malta should consider having a national culinary curriculum that would serve to teach such skills from an early age. To this effect, the learning of cognitive skills through the imparting of culinary skills could inspire programmes across all levels of learning, including higher education and tertiary education.

It appears that through the use of video modelling, and in vivo methods of instruction, persons with intellectual disabilities have improved their performance during a cooking program. Overall, their learning increased in all aspects of the different cognitive learning dimensions. What is yet to be assessed is whether there is a discrepancy in effectiveness between either of the instructional methods used for this study, that is, if one is more efficient than the other, or even if they are complementary to one another. Charlop, Le and Freeman (2001: 550), who studied children with autism, provide a few hints as to which of the two is better when compared to one another as they found that:

“Video modeling is superior to live demonstration because it (a) presents concepts in a systematic way and in a relatively simple format, (b) effectively gains and keeps the child’s attention, and (c) is a less emotionally laden way to learn. Conversely, in vivo teaching is less systematic, contains more cognitively complex surroundings, is less efficient in keeping attention, and is more anxiety arousing for the child than video modeling.”
Day (2015) also proved that both models are valuable and effective for persons on the autism spectrum disorder. In her experiment with students on the autism spectrum disorder, she explained that learning of four different vocational skills occurred for three out of four participants, and the mastery of three out of four skills for one participant. There could be some differences when studying young people with different disabilities rather than children with autism; as such, what could be studied in the future is if the two together make for a positive impact on the cognitive learning of students, instead of an either-or approach.

In vivo and video modelling methods of instruction have thus been shown to facilitate learning for more complex tasks. These methods of instruction have shown to favour learning in the following ways:

- When students are guided through the process of completing a task, and after having seen it completed in front of them in class, they could then return to their respective spaces to carry out the task on their own. They could control the pace of completing the task with the use of the playback button on the video recording that aided them through the process of completing the task;
- Visual learning showed itself to be a more effective way of learning for people with intellectual disabilities;
- Learning by listening to instructions also proved to be a feasible avenue for learning. This could be made use of through the use of the video recordings;
- Video modelling and in vivo learning are preferable to reading instructions.

Therefore, through these collective methods of instruction, what has been demonstrated is that participants improved their overall cognitive learning by acquiring the skills for further learning, thereby being better equipped to face real-world challenges in a growing knowledge economy. With these positive results it appears that learning did in fact occur. Some points to consider are that participants learnt the skills of culinary arts through repetition with an eye open to reflective practice about what they were doing. This element of reflective practice using the instructional methods above, could with guidance, prompt the people with disabilities to decide on better courses of action in future endeavors. This would according to Timpe’s (2016) definition of agency, where she states that agency “is typically taken to involve the ability to respond to reasons and to guide or control one’s behaviors in light of those reasons” (p. 769), permit people with disabilities to be more independent.

Overall, it could be said that the method of instruction via video modelling does improve learning, something which is consistent with what Mc Kinney et al. (2009) found, that is, that the option to move back and forward at one’s own pace is congruent with learning. Therefore, if in this case participants were able to learn because the method of instruction was adequate, then this learning technique could be applied more widely across different subjects. In addition, the tasks taught were simple; however, since the results showed that effective learning was happening using these methods of instruction, there are grounds to widen the learning horizons of persons with disabilities by teaching skills that require more complex operations and thus enable them to be better competitors in the knowledge economy. Whether the two methods of instruction being used simultaneously had a positive effect on one another, thus further enabling the learning process, requires further detailed study to be confirmed or otherwise.
Reference


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