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An intervention model for developing self-directed learning skills in NEET-youth: a literature review

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In response to the growing need for self-directed learning (SDL) skills in a rapidly changing world, research was conducted to map interventions that support SDL skills, aiming to find a model for supporting SDL skills in NEET-youth. SDL competencies support continuous personal development and coping with change. There is a significant number of young people in society who do not participate in working life, education, or training (NEET-youth) and are characterized by a low level of education. Little has been done to support SDL skills interventions for them; however, bringing young people back to the education path is a crucial issue. This raises important questions about which supportive approach and tools are most beneficial for developing SDL skills in NEET-youth, and how best to implement them. This literature review is based on the analysis of 25 articles. The results of the study showed that SDL interventions have not been used for NEET-youth, and therefore, the new model was created. In the case of NEET-youth the SDL intervention should be seen as a non-formal learning process that combines various activities that enable self-reflection and real-life experiences for acquiring new positive learning experiences.

KEYWORDS

self-directed learning, NEET-youth, dropouts, support, intervention

Introduction

A rapidly changing society requires constant reorientation, retraining and adaptation. In order to remain actively engaged in the labor market and aligned with societal changes, individuals need to continuously develop themselves to adapt to these changes. The International Labour Organization (ILO, 2021) highlights an increasing demand for workers with strong core skills and motivation to learn and adapt throughout their professional careers. Educational practices have to generate educational models and formal/informal approaches that facilitate the development of 21st century competencies in a complex, changing world (González-Pérez and Ramírez-Montoya, 2022). In this context, attention must be paid to the fact that there are many young people in society who have discontinued their education and do not participate in the labor market. In 2022, 11.7% of 15–29 year-olds in the European Union were neither in employment nor in education and training (i.e., NEET-youth) (Eurostat, 2023). The target group of young people may miss out on the development of modern, future-oriented skills.

Self-directed learning (SDL) supports individuals in pursuing learning throughout their life span and equips people with the skills and competencies required to continue their own “self-education” beyond the end of formal schooling (Candy, 1991). The mission of educational institutions through learning processes is to contribute to people’s ability to learn and their desire to continue their learning path. NEET-youth who do not participate in educational activities miss out on activities that support SDL and the skills to ensure that they become lifelong learners and individuals who continually adapt to change. Based on this, there arises the need to investigate how to support SDL skills in NEET-youth.

Mawn et al. (2017) have highlighted that by considering a broad range of interventions, including classroom training or work experiences, there are so far no effective practices for social engagement. Valiente et al. (2020) have criticized lifelong learning policies in Europe for NEET-youth because they have offered work-oriented education and training but avoid addressing the poor labor market prospects of young people. Rahmani and Groot (2023) have emphasized the importance of research in determining optimal strategies for enhancing the lives and prospects of NEET-youth, given the constraints posed by limited availability and quality of information on this target group. Knowledge about methods and tools for developing skills among NEET-youth would enable the development of interventions that help young people return to the learning path.

“NEET” label often encompasses a diverse group of young people, each displaying different characteristics and potential needs for intervention (Yates and Payne, 2006). Despite the diverse backgrounds of young people, the Authors’ study shows significantly lower SDL skills among NEET-youth, especially in factors such as *openness to new experiences*, *future orientation* and *responsibility*, compared to their peers in education or employment. To develop these skills, it is necessary to study the impact of various SDL intervention on different factors and to be able to combine activities that specifically support the characteristics requiring support among NEET-youth.

SDL is mostly based on the learner-centered approach (Knowles, 1975; Brockett and Hiemstra, 1991), but there can be differences in the case of different interventions. The aim of this research is to identify the main approaches in interventions (e.g., learner-centred or teacher-centred). NEET youth may have encountered more teacher-directed learning during their studies, which has not supported their autonomy growth, and the experience of learning based on SDL principles has been insufficient.

Therefore, this article provides a narrower perspective on supporting NEET-youth, emphasizing interventions that enhance the self-efficacy and self-management of individuals for continuing their own learning path and adapting to changes in society and the labor market. The study aims to analyze the intervention tools used for the development of SDL skills and to find an appropriate intervention model to develop SDL skills for NEET-youth.

Conceptual framework

Self-directed learning

In adulthood, people are expected to be independent, capable of making decisions for themselves, and responsible for their own well-being. The extent to which we successfully and continuously build a

knowledge base drives who we are, and the accumulation of knowledge built up over a lifetime drives how we operate within society (Cronin-Golomb and Bauer, 2023). Candy (1991) has highlighted that a person may be regarded as autonomous to the extent that he or she conceives goals and plans, exercises freedom of choice, uses the capacity for rational reflection, has the willpower to follow through, exercises self-restraint and self-discipline and views themselves as autonomous. SDL skills have become crucial in the 21st century, and education has placed significant emphasis on developing these skills.

Utilizing metacognitive skills entails being aware of one’s beliefs, attitudes, and experiences, allowing for the integration of these internal states with the external environment and events to construct meaning from information (Patterson, 2011). Continuous learning and individual development should be integral components of every individual’s life, facilitating the achievement of contentment and balance between one’s aspirations and the current reality, all the while guaranteeing steady progress toward individual objectives. SDL can be conceptualized as a tool for empowerment or change – and therefore represents a competence that is especially important for living and working successfully in the modern world.

Non-cognitive skills have a long-term positive effect on participation in education (Farrington et al., 2012). Previous research has found that people who are more self-directed in their studies better understand their learning needs (Jossberger et al., 2010), are more satisfied with their lives, and have a more purposeful direction regarding their future aspirations (Edmondson et al., 2012).

School can support learners to be autonomous and independent lifelong learners, during which they will need assistance acquiring learning skills, attitudes, and knowledge to develop a sense of ownership over their learning and the ability to perceive learning beyond educational participation (Bolhuis, 2003). Fostering self-directed learning competence in formal educational settings is a prerequisite for enabling competent self-directed learning in informal or non-formal learning contexts (Morris, 2019). In situations where these skills have remained insufficient, learners may drop out of school or there may be a general disruption to their learning path.

In cases where young individuals are not actively involved in formal education, the responsibility for fostering their SDL skills may shift to other institutions. The development of SDL skills is then not only an issue in formal education but also important in all other contexts, especially for those people who do not participate in education. Unsurprisingly, individuals who have discontinued formal education and require assistance developing their SDL skills to re-engage in studies may encounter challenges.

NEET-youth

Young people who are not in education, employment, or training are called NEET-youth (Furlong, 2006). In 2022, 11.7% of the 15–29-year-olds in the EU were neither in employment nor in education and training (Eurostat, 2023). The highest concentration of NEET-youth can be seen among young people with low education (Eurostat, 2022). NEET-youth as the target group is mostly characterized by a lack of skills, a lack of capacity (Bolhuis, 2003), a low self-perception of transition to adulthood and a negative vision about the future (Parola et al., 2023). Yates and Payne (2006) has highlighted that the ‘NEET’

category encompasses a diverse group of young individuals, which poses a challenge to the effectiveness of identifying and targeting interventions for these youths solely based on their 'NEET' status. Therefore, there is a need for specific assessment tools and intervention programs.

NEET status can often be the culmination of a series of educational failures over the years, and so different models of education provision are needed to prevent what could otherwise simply become an extended period of failing in an education system (Hutchinson and Kettlewell, 2015). Relative low skill level and low educational attainments significantly increase the probability of reporting long-term NEET statuses (Jongbloed and Giret, 2021). The need exists for interventions that effectively respond to the needs of NEET-youth, and it is important not only to support NEET-youth but also to prevent young people from entering NEET status in the first place (Mawn et al., 2017). Support is necessary to prevent young people from entering long-term NEET status, which leads to prolonged economic inactivity, negatively impacting both the individual and their family (Ralston et al., 2022). The interventions that are more focused on psychological aspects, such as motivation, future expectations, educational aspirations, goal attainability, investing in active efforts, and intrapersonal agency, can protect teenagers from becoming NEET-youth (Mawn et al., 2017; Ripamonti, 2023). Therefore, the personal characteristics of NEET-youth can be barriers to active participation in the lifelong learning process and society in general, and it is important to focus on interventions that can support young people's skills and competencies to help them overcome these challenges.

Yates and Payne (2006) have emphasized the need to support NEET youths based on their specific needs and to avoid, for example, pushing them into training and education if they feel they are not ready for it. Kõiv and Saks (2024) have measured that NEET-youth have lower results in all SDL factors, with a statistically significant difference compared to their learning/working peers in factors such as openness to new experiences ($p=0.001$), responsibility ($p=0.002$), and future orientation ($p=0.026$). These results indicate that for those NEET youths who have the opportunity to continue their educational journey, but lack the necessary skills, interventions should be implemented to enhance their self-directed learning skills.

SDL interventions

Supporting NEET youth can occur through systemic approaches embedded within society or through targeted interventions at the individual level to catalyze transformation (Flynn et al., 2024). Paabort et al. (2023) collected data confirms that educationally focused approaches are just a few, next to the more significant general political, social, or contextual approaches. Despite the political attention this group receives, few studies utilize a robust design to evaluate the effectiveness of interventions for them (Stea et al., 2024).

Educational institutions should help learners to become independent lifelong learners (Bolhuis, 2003). However, it might be complicated for people who have dropped out of formal education and need support in developing SDL skills in order to return to study. Therefore, solutions must be found to improve the SDL skills of all target groups, including the people who have dropped out of the education system.

Fostering SDL competence in formal educational settings seems fundamental for empowering learners to deal with a world that is becoming ever more complex and changeable (Morris, 2019).

Compulsory education should prioritize lifelong learning skills, yet students still graduate with varying levels of proficiency due to individual differences (Cornford, 2002). Given the non-participation of many people in the education system, the development of SDL skills needs to be looked at more broadly, and interventions should be available in different contexts.

SDL is a process in which the learner assumes primary responsibility for planning, implementing, and evaluating the learning process, and the education agent or resource often plays a facilitating role in the process (Knowles, 1975; Brockett and Hiemstra, 1991). Kõiv and Saks (2023) define the construct of self-directed learning for NEET-youth as a supported process in which a person's attitude towards learning improves, and the subject develops initiative, independence, and abilities in shaping their educational path with a positive view of the future.

The integration of the learner-directed approach in addition to the traditional teacher-directed learning approach is becoming a growing trend. The teacher as facilitator can be seen as a key role in providing numerous kinds of support because of the many barriers to self-direction that a learner will face – providing positive emotions and giving support (Brockett and Hiemstra, 1991; Schweder and Raufelder, 2019). Even if SDL is seen as a learner-led learning process, it cannot happen in isolation, and especially for vulnerable groups, support is essential. Garrison (1997) highlighted the need for educators to create learning environments and conditions that facilitate learner's self-direction. Interventions to develop SDL skills should focus on strengthening the learner-directed approach. Since many adults globally lack competence in self-directed learning upon exiting formal education, adult education becomes crucial for fostering this skill, but adult education practitioners must be prepared to offer support to facilitate this process (Morris, 2023).

The aim of the study

Although there is extensive research on SDL in various target groups, far too little attention has been paid to investigating NEET-youth SDL skills (Ellena et al., 2021; Kõiv et al., 2022). There is a lack of knowledge about the most effective interventions for developing NEET-youth SDL skills and it is not known to what extent and how the different support measures contribute to the development of these skills. Therefore, the goal of this research was to identify intervention activities that support the development of SDL skills and can be used to develop SDL skills in NEET-youth based on a systematic literature analysis. The results of the research help to create an appropriate intervention model to develop SDL skills in NEET-youth. Proceeding from the aim of the study the following research questions were formulated:

- 1 What are the main approaches for developing SDL skills?
- 2 What methods and tools are used in developing SDL skills?
- 3 Which factors of the SDL construct have interventions affected?

Methodology

Search procedures

To achieve the objective of identifying effective SDL intervention model for NEET youth, this study employs a systematic literature

review. The search for articles to include in the systematic literature review was conducted between March and May 2023. The search targeted studies that implemented intervention activities aimed at the development of SDL skills in young people who were out of education. The selection process for the systematic literature analysis was based on the PRISMA (Preferred Reported Items for Systematic Reviews and Meta Analyses) framework (Moher et al., 2009).

The initial search for articles was carried out in the Scopus and Academic Search Complete, APA PsycInfo and ERIC databases. As the aim of the research was to learn about the interventions for SDL development in young people, the advanced search function and the following search terms were used to identify an initial pool of articles (see Table 1).

As the earliest studies on SDL go back to the middle of the 20th century, the search was constrained to the period 1950–2023. In addition, *full text* and *English* as the language of the articles were applied in the search procedure. Self-regulated learning as a term was included with the terms because according to Jossberger et al. (2010), SDL that is situated at the macro level includes self-regulated learning (SRL) at the micro level, and concerns processes within task execution.

The primary results showed that there were no articles on SDL interventions targeting young people with NEET status and dropout youth generally. In addition, the number of articles extracted as a result of the first search was very small (N=8). Therefore, it was decided to conduct an additional search using the same databases, but only the terms *self-directed learn** and *intervention*. The result of the new search was 419 articles. Duplicate articles (N=93) were deleted from the selection. The selection and exclusion of articles was based on the same criteria. The additional articles (N=17) were added to the pool. An overview of the process of the two searches according to the PRISMA framework is provided in the Figure 1.

In the first round of screening, the eligibility of the titles of records was estimated by four researchers, in the second round by two researchers. The inter-rater average reliability resulted in 75.5%. The researchers worked independently, and a meeting was held during the process to refine and agree on selection criteria.

The initial search of the databases for relevant articles resulted in identifying 1,511 articles. After deleting duplicates, the number of titles screened by researchers was 1,350. The inclusion criterion was a clearly visible association of support and intervention in education in the title, but a title was excluded if it was generally about ICT or education and learning-teaching, intervention of medicine or the

COVID-19 topic. The second-level screening resulted in 390 abstracts selected from the pool of 1,350 articles. The articles were excluded if the study was a comparative analysis about different personal characteristics without any intervention, general massive open online course (MOOC) issues or the connection with SDL or SRL was missing. The screening of abstracts left us with 95 studies.

As the next step, the full text of each identified study was downloaded. During this step, full text screening was performed to confirm the article's eligibility. The texts were assessed based on one or more of the following criteria: (1) the article mentions an intervention or program that aims to promote self-directed learning in NEET-youth; (2) the article discusses outcomes related to self-directed learning; (3) the article uses measures or tools to assess self-directed learning or related constructs; (4) the article includes a sample of NEET-youth or a subgroup of NEET-youth, such as unemployed youth or school dropouts. Articles focused on any other topics or issues that are not directly related to intervention, SRL or SDL were excluded. As a result, 25 articles that focused on intervention or support for SRL and SDL formed the final pool for subsequent analysis.

Data analysis

All the collected data was systematically compiled using MS Excel. The following data was included: (a) descriptive information about the study (i.e., title, authors, year of publication, journal); (b) data needed for answering the RQs – sample, approach, context, used methods and tools; (c) measured factors, measurement tools and results. For validation purposes, two authors analyzed the same full texts of 10 studies using the given table and compared the extracted data. A consensus was reached on the minor differences which occurred.

Methodological qualities

The aim of the current review was to find an appropriate intervention model to develop SDL skills in NEET-youth. Consequently, all 25 articles addressed the principles of the intervention and support for SDL skills development, highlighting the theoretical basis and in 20 of them also practical intervention tools and methods. The approaches and intervention tools used, the method and measured impact were categorized according to the data in the articles.

Most of the articles described different factors emerging from the interventions and the support principles of SDL, in which the approach, methods and tools were important and key to the present study. These articles added valuable material in addressing the support and intervention tool for SDL skills development in young people.

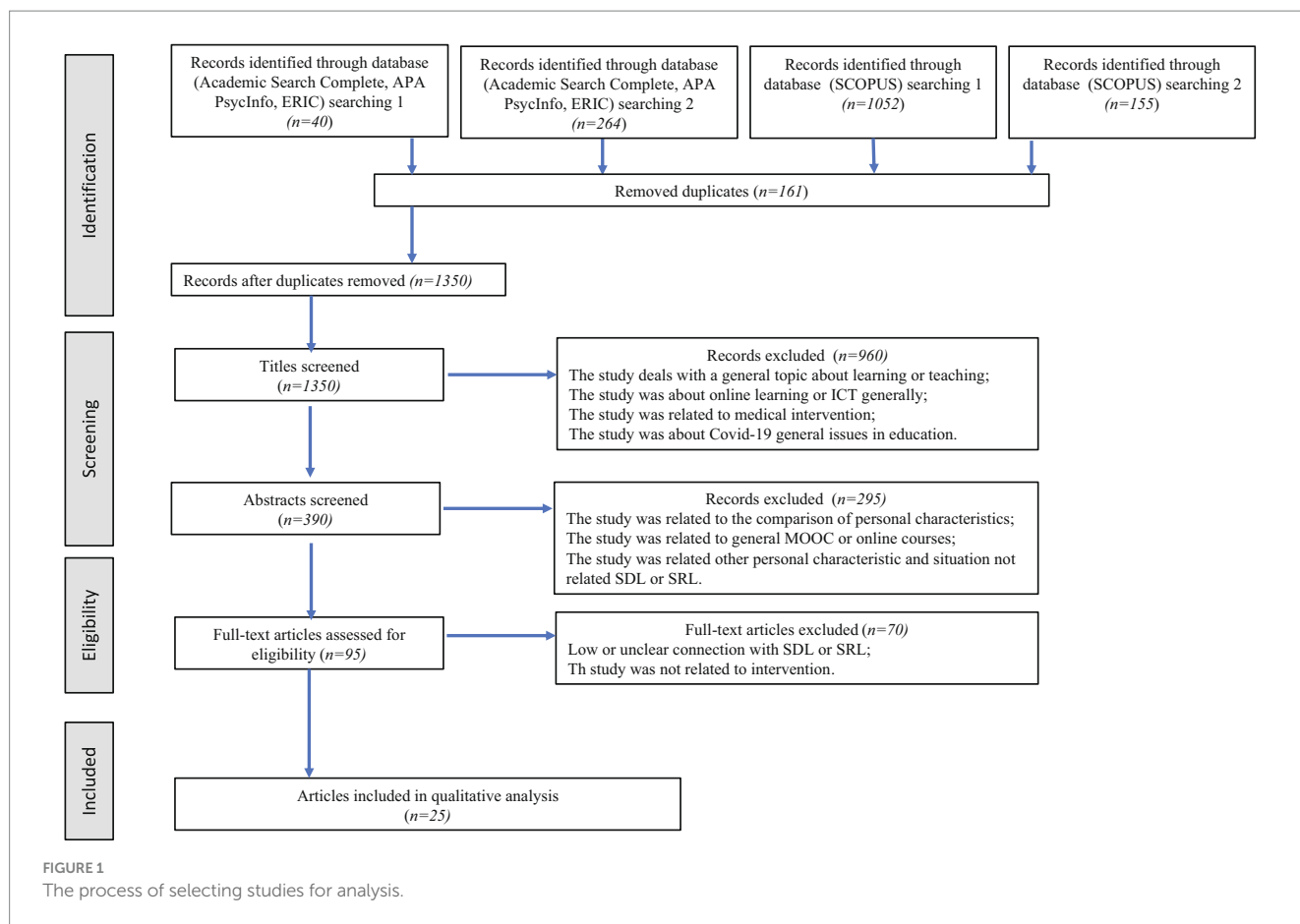
Key concept definition

In the context of this study, several terms were used to categorize the different elements of the interventions. First, the term *approach* was used to refer to the main approach of the intervention, and the term approach was divided into *facilitator-led* and *learner-led approach*. Being learner-centered is the main approach in line with

TABLE 1 Search terms for the first search.

Concept 1	Concept 2	Concept 3
self-directed learn*	NEET	support*
SDL	unemployed youth	scaffold*
self-regulated learn*	dropout	develop*
		enhanc*
		train*
		coun?el*
		intervention*
		mentor*
		facilitat*
		coach*
		program*

*Missing ending of word stems.



SDL, but the intervention structure could be seen from the facilitator or learner perspective. The facilitator-led approach is based on the teacher-led approach, but is called facilitator-led because, in the case of NEET-youth, a direct connection with a teacher is not always available. A facilitator-led process refers to an instructional approach in which the facilitator takes on the central role in guiding and directing the learning process of learners and is taking an important role in planning and delivering the learning. In the learner-led approach, learners take an active role in directing their own learning, making decisions about what and how they will learn, and taking responsibility for their learning process. The role of the facilitator in a learner-led approach shifts from being the sole provider of knowledge to that of a facilitator, mentor, or coach.

Another key term used in the current study is *method*, which refers to a structured approach used to accomplish a specific goal and involves a series of organized steps or procedures as tools that are applied to achieve the desired outcome. The term *tool* in the study context can refer to any technique, simulation, material, platform, or resource that is used during the intervention process.

Study components

For each article, the main approach, context, tools, and methods of the intervention were identified, and the main characteristics for each intervention were generated. The results were then synthesized and used to find the suitable SDL intervention model for NEET-youth.

The intervention tools ($n=20$) were mapped, highlighting the main approach ($n=2$) and methods (6) and tools (12), as well as how the results are measured and which skills or factors the intervention had a positive impact on.

Based on the definition of SDL for NEET-youth (Kõiv and Saks, 2023) and the factors of SDL (Kõiv and Saks, 2024), the results were found to be related to one or another of these factors. For example, the positive impact on motivation was categorized under the *attitude* factor; results related to goal-setting were linked to *future vision*; positive outcomes related to the learning process and understanding of one's own learning was associated with *metacognition*; results related to experiences were linked to *openness to new experiences*; and problem-solving skills were associated with *resilience*. For the purpose of clearer understanding, the factors formulated by Kõiv and Saks (2024) are used in the subsequent analysis.

Based on the analysis of the selected studies, their theoretical frameworks and corresponding methods and tools, an intervention model was prepared.

Results

Descriptive data

The studies included in the review come from peer-reviewed scientific journals. The study domains involved were mostly from the field of education (13) and education technology (4), psychology (3),

youth (3), and medicine and health (2). The studies are published in very different journals, only the journals *Frontiers in Education* and *Vocations and Learning* appeared twice.

As the search terms of the study included both SDL and SRL, the selection comprises articles about interventions for SDL (15) and SRL (5). The context of the studies is mostly formal education – primary or secondary school (4), vocational education (4) or higher education (9). One study was related to a MOOC course, one to non-formal learning activities, and one was associated with adult education. The studies involved both face-to-face interventions (13) and digital interventions (5) or a combination of both (2). Furthermore, in some face-to-face interventions some activities were conducted online (e.g., log data, questionnaire). The studies were conducted in different countries, including European countries such as the Netherlands, Switzerland, Germany. They were also conducted in Africa, America, and in Asia. The broad geographical and cultural scope in these practices made it possible to obtain information that is adaptable to various cultural contexts.

Most of the studies, in terms of the methods applied and defined by the inclusion criteria, were empirical in nature and described the process and results of the intervention. Some articles (5) gave useful theoretical overviews and suggestions about the interventions. The vast majority of cases reported their data collection tools and data analysis methods. The data for analysis was collected through a combination of various sources such as interviews, log data, observations, focus group discussions and various types of validated targeted questionnaires [e.g., Self-Directed Learning Readiness Scale (SDLRS) (Guglielmino, 1977); PRO-SDLS (Brockett and Hiemstra, 1991); SDL skill scale (Ayyildiz and Tarhan, 2015); Self-regulated Online Learning Questionnaire – Revised (SOL-Q-R) (Jansen et al., 2018)] used independently or combined with other instruments. Pre-test and post-test were the major methods used to analyze the results of the interventions. Studies that employed a quantitative approach had high reliability scores, $\alpha = 0.66\text{--}0.95$ (see Table 2). While the context of the study, as well as the participant information, was almost always reported; there were some gaps with regard to information about the validity confirmation procedures for the data collection instrument(s). Therefore, due to the lack of data in this direction, the practice of these methods and tools was included only as suggestions in our analysis framework.

All interventions were categorized based on the main approach, methods, tools, the main learning focus (SRL or SDL), and impacted factors (see Table 2).

The interventions were primarily in the form of training courses, supportive measures, or practical interventions, and they were piloted over a specific period. Support tools used during the general learning process were mainly piloted over one or two semesters in schools. The training courses varied in duration depending on whether it was a course for the introduction of SDL or a more complex program that included introduction, practice, and reflection. Their duration ranged from 4 weeks to 1 year.

Interventions supporting SDL

Five out of the 25 studies focused solely on SDL or SRL interventions, while 20 articles included studies that examined different interventions, such as training courses, support methods

integrated into existing courses, individual practice, coaching etc. The primary context of the interventions was formal education, either in upper secondary school or university. The target groups for the interventions were students at various educational levels and stages of the learning process. Only three interventions were based on out-of-school activities or adult education. No intervention was targeted at those who had dropped out of education and were not participating in learning.

The main approach for developing SDL skills

The main approaches used in the interventions were analyzed in response to the first research question: *What is the main approach for developing SDL skills?*

Despite the different approaches and methods used in the interventions, all of them aimed to develop a self-directed learner and move towards a learner-directed learning process. Based on the structure of the interventions, they were categorized into either facilitator-led or learner-directed approaches. The facilitator-led approach was more strongly recognized in intervention methods such as training sessions, integrated activities in other courses, and regulation activities. These methods were structured, built up, and guided by a teacher or facilitator. Interventions as experience or hands-on practice provided a framework for action but the participants were free to decide the direction of the process. In the analyzed articles, intervention methods were almost equally divided into facilitator-led ($n = 11$) and learner-led approaches ($n = 9$).

Methods and tools for developing SDL skills

The intervention methods and tools used were then analyzed and categorized in order to answer the second research question: *What methods and tools are used in developing SDL skills?*

The intervention methods included facilitator-led training sessions ($n = 2$) and activities integrated into the course of a curriculum ($n = 4$). The learner-led interventions involved coaching ($n = 2$) and experience/hands-on practice ($n = 4$). There was only one intervention as a training session for trainers or facilitators and several (6) training sessions for learners. While the training for facilitators was focused on teaching methods for SDL, the sessions for learners focused on both SDL and SRL. There were also some tools that were integrated into the courses, but they were primarily meant to support SRL in the learning process. The digital promise (Morris-Eyton and Pretorius, 2023) as a tool was used for SDL skills development. Considering that a learning-supportive context (Brockett and Hiemstra, 1991) and an understanding of learning (Knowles, 1975) are important prerequisites for SDL, training programs that support the understanding of SDL in both facilitators and learners are crucial in developing SDL.

Learner-led activities were categorized into both personal coaching and practical hands-on activities. Given that the definitions of SDL by Knowles (1975), Brockett and Hiemstra (1991), and Köiv and Saks (2023) emphasize the importance of support and interaction with the facilitator in the process of developing SDL skills, it is essential to consider coaching interventions throughout the process. Coaching and mentoring were consistently present in the interventions. Since SDL is not only a theoretically learned skill but

TABLE 2 The characteristics of the interventions.

Approach	Method	Tool	SRL/SDL	Factors*	Reliability (α)	Reference	
Facilitator-led	Training	Training course for teachers/facilitators	SDL	MET, ATT, RSP	Qualitative study	Van Tonder et al. (2022)	
		Training course for learners	SRL	RES, MET, FUT	Task orientation $\alpha = 0.83$; Ego-enhancing orientation $\alpha = 0.85$; Ego-defeating orientation $\alpha = 0.87$	Minnaert et al. (2017)	
			SDL	RES, RSP, MET, FUT, ATT	OLSES test $\alpha = 0.96$; SRSSDL $\alpha = 0.95$; OSLQ $\alpha = 0.90$; Pre-test-post-test reliability $\alpha = 0.97$	Stephen and Rockinson-Szapkiw (2021)	
			SDL	RSP, ATT, MET	SDLRS $\alpha = 0.94$	Chen et al. (2022)	
			SRL	ATT, RES, RSP	AAQ-II $\alpha = 0.94$; Distress $\alpha = 0.80$; Acceptance $\alpha = 0.14$; GSE $\alpha = 0.93$; Study habits $\alpha = 0.81$; Life habits $\alpha = 0.74$	Keane et al. (2022)	
			SDL	RES, FUT, MET, ATT, OPN, RSP	SDL $\alpha = 0.89$; Lifelog Learning Propensity $\alpha = 0.87$; Intention to Participate in Vocational Training $\alpha = 0.91$; Information Literacy Self-Efficacy $\alpha = 0.90$	Mbagwu et al. (2020)	
			SDL	ATT, MET, FUT, OPN, RSP	Study engagement $\alpha = 0.88$; Life-long learning tendency $\alpha = 0.87$	Chukwuedo et al. (2021)	
	Activities integrated to course or curricula	Questionnaires and messages	SRL	MET, RSP, RES	SRL components $\alpha = 0.66-0.89$	Mejeh and Held (2022)	
		Digital promise	SDL	RP	Qualitative study	Morris-Eyton and Pretorius (2023)	
		Mind wandering	SRL	RES, MET, RSP	Insufficient effectiveness	Randall et al. (2022)	
		Learning workshops	SRL	MET	Self-regulated Online Learning Questionnaire different scales $\alpha = 0.69-0.92$	Jansen et al. (2020)	
		Coaching	Personal coaching	SDL	MET, FUT	Autonomy need satisfaction $\alpha = 0.79$; Competency need satisfaction $\alpha = 0.79$; Relatedness need satisfaction $\alpha = 0.78$; Intrinsic motivation $\alpha = 0.80$; Identified regulation $\alpha = 0.80$; Introjected regulation $\alpha = 0.83$	Wolff et al. (2020) and Schweder and Raufelder (2021)
			Peer – learning forums	SDL	MET	PRO-SDLS factors $\alpha = 0.80-0.89$	Gaspar et al. (2009)
			Experience/hands-on practice	Youth HUB, out-of school activities	SDL	ATT, RES, RSP	Qualitative study
Problem-based activities	SDL			ATT, FUT, RES, RSP	SDLRS $\alpha = 0.91$	Golightly (2018)	
	SDL			RES, OPN, MET	Qualitative study	Abubakar and Arshad (2015)	
	SDL			RES, RSP, MET, OPN	SDLRS $\alpha = 0.899$	Wong and Kan (2022)	
	SDL	RES, OPN, MET, RSP, FUT		Qualitative study	Cremers et al. (2014)		
Inquiry-based activities	SDL	RSP, OPN, RES, MET, FUT	Enjoyment scale $\alpha = 0.77$ Effort scale $\alpha = 0.79$	Schweder and Raufelder (2022)			
Portfolio	SDL	ATT, MET, FUT	Qualitative study	Beckers et al. (2019)			

*MET, metacognition; OPN, openness to new experiences; ATT, attitude; RES, resilience; RSP, responsibility; FUT, future orientation.

also requires practical experience, several implemented interventions have incorporated learning by doing activities. Depending on the target audience and context, it is possible to either combine these into a holistic solution or utilize various components of the interventions in the educational process.

Attention has been paid in the interventions to various aspects that may affect the learning process, and individual independent tools

have been implemented. Since the studies did not demonstrate strong impact on participants, these interventions may be applied in the intervention model as recommended activities, but not as core activities. For example, specific behaviors linked to reducing mind wandering (Randall et al., 2022) or e-portfolio, helping learners self-assess their performance on learning tasks (Beckers et al., 2019; Payne, 2021).

Since intervention studies have utilized evaluation instruments not only for studying the intervention but also for assessing its impact, the implementation of these evaluation instruments provides significant insights regarding the characteristics of the participants. Therefore, the evaluation instrument should be considered as an integral part of the intervention as a whole.

Effect of the interventions on skills

The impact of interventions was assessed in very different ways, including both qualitative and quantitative methods, which made comparing the results of the intervention challenging. The description of the intervention results was coded and categorized based on the SDL factors for NEET-youth identified by Kõiv and Saks (2024). This categorization is important in this study for identifying SDL interventions suitable for NEET-youth. As a result, it can be highlighted that while facilitator-led activities primarily influenced the learner's metacognition, responsibility, and attitudes, learner-led interventions also supported openness to new experiences, resilience, and future orientation.

The findings from various studies underscore the significance of comprehensive guidance in intervention. Personal coaching by a coach has been effective in developing future orientation and metacognition (Beckers et al., 2019; Wolff et al., 2020), but peer-coaching has not been as effective (Gaspar et al., 2009).

When planning interventions, it must be considered that coaches and trainers also need knowledge of SDL. The study by Van Tonder et al. (2022) confirms the positive effect of training for trainers on teacher attitudes and beliefs about teaching, as well as its impact on classroom practices and learner development, including the academic and personal well-being of learners. The results of several studies emphasize the importance of comprehensive guidance during interventions. Minnaert et al. (2017) highlight the positive synergy of combining the implementation of behavior counselling and self-regulation strategies to enhance learners goal orientation. Reflective activities, such as learning logs, have shown a positive impact on learner self-management, goal commitment, self-evaluation, and general SDL (Stephen and Rockinson-Szapkiw, 2021). The interventions have taken place in the context of courses supporting learners' abilities, including positive effects on learner self-efficacy, self-awareness, curiosity, motivation, and coping strategies (Chukwuedo et al., 2021; Chen et al., 2022; Keane et al., 2022). In courses where learners took a leading role in significant activities, including real-life situations, and facilitators played a motivating role, positive impacts on lifelong learning tendencies and the intention to engage in skills upgrading were observed.

Activities integrated into ongoing courses mainly supported self-regulation, such as the digital promise tool presented by Morris-Eyton and Pretorius (2023), which acted like a learning agreement and promoted taking responsibility for personal learning outcomes. Positive effects on metacognition, responsibility, and resilience were observed when using self-report questionnaires (Mejeh and Held, 2022; Randall et al., 2022). Jansen et al. (2020) assessed the limited impact of video lectures throughout the course and concluded that implementing a single video training at the beginning of the course would be more effective.

Interventions designed for learners to take a leading role in activities had a more wide ranging positive impact. These activities were based on experiential and hands-on methods. Growth in

leadership skills, independence, skill upgrading in a personally interesting field, increased confidence, self-discipline, and other skills are different abilities that were developed through experiential and hands-on learning activities (Cremers et al., 2014; Hauseman, 2016; Golightly, 2018; Schweder and Raufelder, 2021; Wong and Kan, 2022). Learning by doing as a tool, along with assessing learning needs, setting learning goals, sourcing for resources, choosing strategies, and evaluating the results, had a positive effect on lifelong learning, information management, and problem-solving skills (Abubakar and Arshad, 2015). These are effective tools that support all the essential factors of SDL.

In summary, it can be said that most of the studied interventions had a positive impact on SDL factors, but the main difference lay in which factor was more significantly influenced. To create effective interventions, it is necessary to combine various activities based on the needs of the target group. Needs assessment can benefit from both goal-setting with coaching support and the use of self-report questionnaires.

Discussion

The results of the study underscore that the development of SDL skills has predominantly been discussed from the perspective of young people in various forms and levels of formal education. The development of SDL within the school environment is very important, but at the same time, this raises the question of how we can help young people who have dropped out of school reintegrate back into the educational path. It appears that the previous learning paths of these young people may have been interrupted, in part, due to low SDL skills. The low levels of SDL skills were also confirmed in the research by Kõiv and Saks (2024).

Despite the fact that NEET-youth do not participate in formal education and training, they may still take some courses and workshops on their own. It is important to avoid the assumption that they are inherently ready to learn independently and consciously develop themselves. All adults who undertake self-directed learning are competent self-directed learners; their learning outcomes might not be efficient or successful in achieving their learning objectives (Morris, 2019).

The present study did not identify any SDL interventions specifically targeted at NEET-youth. Therefore, the findings align with the study's objective of creating SDL intervention model. Mawn et al. (2017), in analyzing interventions specially for NEET-youth, noted that the vast majority of interventions were multi-component, combining some form of education or skills-based classroom training with on-the-job training (e.g., internship, work experience, job placements). Building on the general practice of supporting NEET-youth, the SDL intervention should also be seen as multi-component process.

NEET-youth, like their peers, are expected to participate in social life and to be lifelong learners, ready to adapt to changes in personal life and society, and to develop themselves. Recognition and interventions are necessary to foster the growth of SDL skills, also among NEET-youth. Empowering learners using the tools needed to be successful and active learners rather than passive recipients of information will lead to a more fulfilling and productive educational experience for all (Wandler and Imbriale, 2017). Given that the

present study revealed the current practices and results of SDL interventions, but the literature did not highlight interventions specifically directed at NEET-youth, there is a need to discuss which interventions, based on these results, might be recommended for NEET-youth.

Considering that NEET-youth as the target group in the context of SDL has received little attention, it can also be assumed that trainers have not acquired relevant knowledge. In this case, an intervention targeting NEET-youth should include training for facilitators, as illustrated by the example from Van Tonder et al. (2022). Many studies discussed in this research utilized training sessions or workshops to introduce the concept of SDL to young people. This includes the work of Jansen et al. (2020), who highlighted the effectiveness of using video material at the beginning of a course. Consequently, the intervention should also include an introductory SDL course for young people, because as NEET-youth are out of formal learning process, their knowledge about learning skills should be updated.

Across all studied interventions, coaching, mentoring, and the use of tools supporting reflective practices were prevalent. These activities should be consistently implemented throughout the intervention. Since NEET-youth lack daily connections with educational institutions, well-thought-out mentoring activities before and after more intensive programs are also necessary. Long-term and secure mentoring relationships are crucial, especially in the transition processes of young people at risk of marginalization (Ripamonti, 2023). Considering that low self-esteem and previous negative learning experiences are the risk-factor to become a NEET-youth (Rahmani and Groot, 2023), it is important to involve mentors who support young people in setting their personal goals and motivate them. Future orientation was particularly supported by the coaching process (Wolff et al., 2020), including through the creation of portfolios (Beckers et al., 2019). Boles (2014) highlighted that in the case of SDL, it is necessary to find people who would push individuals further than they would push themselves.

As Kõiv and Saks (2024) have pointed out that NEET-youth have statistically significant lower results compared to their learning/working peers in such factors as new experiences, responsibility, and future orientation, the intervention must pay significant attention to these factors. The results of the study also indicated that SDL training for learners (Mbagwu et al., 2020), problem-based learning activities (Cremers et al., 2014), and inquiry-based activities (Schweder and Raufelder, 2022) had the greatest impact specifically on the combination of these factors. Experiential learning through the inquiry-based activities can support NEET-youth develop these skills. Considering that NEET youth may operate in isolation or lack social capital (Rahmani and Groot, 2023), interventions should also involve creating new contacts and exchanging ideas. Experiential learning activities with others would enable them to make new acquaintances and contacts, and also encourage young people to step out of their comfort zone.

The length of the interventions varied according to the type of method, generally ranging from one semester to 1 year. For NEET-youth, for whom this intervention is not part of a longer educational program but rather a skill development intervention, the duration should be similar to one semester (4–6 months). NEET-youth may face various obstacles to participating in the program, such as health issues, low motivation, or caring for a family member, which need to be taken into account when adapting the program duration

to fit the target group. Considering that the evaluation instrument for assessing the SDL skills of intervention participants should be an integral part of the intervention, given the purpose of this study, the SDL-NEET scale created by Kõiv and Saks (2024) can be utilized. This scale has been specifically developed for this target group.

Based on the literature review conducted, a model for an intervention aimed at developing SDL skills in NEET-youth was compiled (see Figure 2).

An intervention aimed at developing SDL skills in NEET-youth should consist of training for facilitators, an introductory course for learners, and activities based on experiential learning and hands-on methods, including problem and interest-based activities. Supportive activities should consistently involve coaching or mentorship, alongside the use of various tools for goal-setting and reflecting on the process. In conclusion, it can be argued that since NEET youth do not participate in formal education, SDL intervention should be constructed as a non-formal learning process integrating diverse activities to facilitate self-reflection and real-life experiences conducive to acquiring new positive learning experiences, emphasizing the critical role of supportive mentorship.

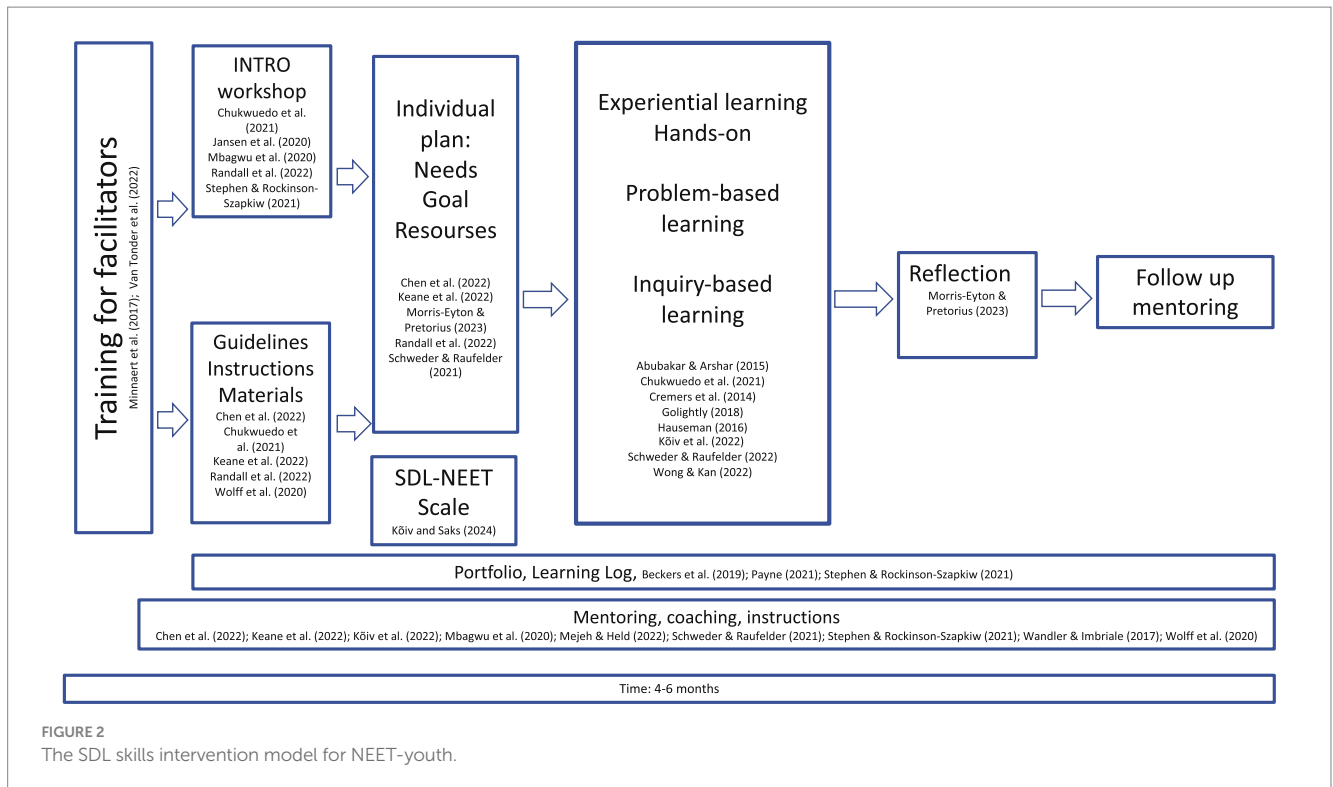
Limitations

The analyzed articles and described interventions focused solely on SDL or SRL interventions for individuals already in education. There is limited evidence about the SDL skills of NEET-youth. Consequently, the discussion and proposed model are only based on a few scientific pieces of evidence about NEET-youth SDL skills. Future research should aim to implement diverse educational practices for individuals not currently in education and test the proposed theoretical model. Given the pronounced significance of mentoring, reflection, and experiential learning within the intervention framework for NEET-youth observed in this study, subsequent targeted research on these themes could yield nuanced insights into identifying the tools within these themes that would be most acceptable and efficacious for this target group.

Despite using search terms such as NEET, unemployed youth, and dropout, the literature review did not yield any interventions, except for a theoretical article written by the authors themselves (Kõiv et al., 2022). This limitation led to the research questions being focused generally on SDL interventions. In addition, it is crucial to consider that NEET-youth constitute a highly heterogeneous target group. Implementing the proposed model must account for the learners' diverse contexts and needs, which can be achieved through the use of special SDL measurement tools and coaching sessions.

Conclusion

This study provides an overview of SDL interventions, revealing a general lack of such interventions for NEET-youth. However, these interventions are urgently needed, as NEET-youth are known to have a low level of education, which is a risk factor for exclusion, and they are expected to return to the education system. The data collected in the study related to characteristics that define the SDL



skills of NEET-youth, allow for the creation of the recommended model for SDL skills development interventions. The practical value of the study lies in integrating various SDL intervention activities into a cohesive whole and considering the situation of learners who are not involved in any formal learning process. The created model enables the initiation of a pilot program, which, based on the results obtained, assesses the impact of the intervention and informs decisions about its future implementation. In conclusion, this study successfully met its objective of identifying the lack of SDL interventions for those who are out of education, and of highlighting the key tools and methods for developing SDL skills in NEET-youth.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Author contributions

KK: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. KS: Conceptualization, Data curation, Investigation, Methodology, Software, Supervision, Validation, Writing – original draft, Writing – review & editing. IG: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing, Writing – original draft. KG: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing, Writing

– original draft. AA: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing, Writing – original draft. VT: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing, Writing – original draft. EP: Conceptualization, Data curation, Investigation, Methodology, Writing – review & editing, Writing – original draft.

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Conflict of interest

All authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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References

- Note: (*) articles that belonged to the pool of systematic literature analysis.
- *Abubakar, A. B., and Arshad, M. Y. (2015). Self-directed learning and skills of problem-based learning: a case of Nigerian secondary schools chemistry students. *Int. Educ. Stud.*, 8, 70–78. doi: 10.5539/ies.v8n12p70
- Ayyildiz, Y., and Tarhan, L. (2015). Development of the self-directed learning skills scale. *Int. J. Lifelong Educ.* 34, 663–679. doi: 10.1080/02601370.2015.1091393
- *Beckers, J., Dolmans, D. H., and van Merriënboer, J. J. (2019). PERFLECT: design and evaluation of an electronic development portfolio aimed at supporting self-directed learning. *Tech. Trends*, 63, 420–427. doi: 10.1007/s11528-018-0354-x
- Boles, B. (2014). The art of self-directed learning: 23 tips for giving yourself an unconventional education. United States: Tells Peak Press.
- Bolhuis, S. (2003). Towards process-oriented teaching for self-directed lifelong learning: a multidimensional perspective. *Learn. Instr.* 13, 327–347. doi: 10.1016/S0959-4752(02)00008-7
- Brockett, R. G., and Hiemstra, R. (1991). Self-direction in adult learning: Perspectives on theory, research, and practice. London, England: Routledge.
- Candy, P. C. (1991). Self-direction for lifelong learning. San Francisco: Jossey-Bass.
- *Chen, C. H., Chen, K. Z., and Tsai, H. F. (2022). Did self-directed learning curriculum guidelines change Taiwanese high-school students' self-directed learning readiness? *Asia Pac. Educ. Res.*, 31, 409–426. doi: 10.1007/s40299-021-00582-w
- *Chukwuedo, S. O., Mbagwu, F. O., and Ogbuanya, T. C. (2021). Motivating academic engagement and lifelong learning among vocational and adult education students via self-direction in learning. *Learn. Motiv.*, 74:101729. doi: 10.1016/j.lmot.2021.101729
- Cornford, I. R. (2002). Learning-to-learn strategies as a basis for effective lifelong learning. *Int. J. Lifelong Educ.* 21, 357–368. doi: 10.1080/02601370210141020
- *Cremers, P. H., Wals, A. E., Wesselink, R., Nieveen, N., and Mulder, M. (2014). Self-directed lifelong learning in hybrid learning configurations. *Int. J. Lifelong Educ.*, 33, 207–232. doi: 10.1080/02601370.2013.838704
- Cronin-Golomb, L. M., and Bauer, P. J. (2023). Self-motivated and directed learning across the lifespan. *Acta Psychol.* 232, 103816–103815. doi: 10.1016/j.actpsy.2022.103816
- Edmondson, D. R., Boyer, S. L., and Artis, A. B. (2012). Self-directed learning: a Meta-analytic review of adult learning constructs. *Int. J. Educ. Res.* 7, 40–48.
- Ellena, M. A., Marta, E., Simões, F., Fernandes-Jesus, M., and Petrescu, C. (2021). Soft skills and psychological well-being: a study on Italian rural and urban NEETs. *Calitatea Vieții* 32, 352–370. doi: 10.46841/RCV.2021.04.02
- Eurostat (2022). Statistics on young people neither in employment nor in education or training. Statistics Explained. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_young_people_neither_in_employment_nor_in_education_or_training#The_transition_from_education_to_work
- Eurostat (2023). Young people neither in employment nor in education and training by sex and NUTS 2 region (NEET rates) [edat_lfse_22]. *European Commission*. doi: 10.2908/EDAT_LFSE_22
- Farrington, C. A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T. S., Johnson, D. W., et al. (2012). Teaching adolescents to become learners. The role of non-cognitive factors in shaping school performance: A critical literature review. Chicago: University of Chicago Consortium on Chicago School.
- Flynn, P., Paabort, H., Milenkova, V., Bojkovska, K., Rocca, A., Hačtrjana, L., et al. (2024). "Rural NEETs: pathways through formal and non-formal education" in NEETs in European rural areas. eds. F. Simões and E. Erdogan (Cham: SpringerBriefs in Sociology, Springer), 35–49.
- Furlong, A. (2006). Not a very NEET solution: representing problematic labour market transitions among early school-leavers. *Work Employ. Soc.* 20, 553–569. doi: 10.1177/0950017006067001
- Garrison, D. R. (1997). Self-directed learning: toward a comprehensive model. *Adult Educ. Q.* 48, 18–33. doi: 10.1177/074171369704800103
- *Gaspar, A., Langevin, S., Boyer, N., and Armitage, W. (2009). Self-perceived and observable self-direction in an online asynchronous programming course using peer learning forums. *Comput. Sci. Educ.*, 19, 233–255. doi: 10.1080/08993400903384869
- *Golightly, A. (2018). The influence of an integrated PBL format on geography students' perceptions of their self-directedness in learning. *J. Geogr. High. Educ.*, 42, 460–478. doi: 10.1080/03098265.2018.1463974
- González-Pérez, L. I., and Ramírez-Montoya, M. S. (2022). Components of education 4.0 in 21st century skills frameworks: systematic review. *Sustain. For.* 14:1493. doi: 10.3390/su14031493
- Guglielmino, L. M. (1977). Development of the self-directed learning readiness scale. Doctoral Dissertation. University of Georgia. Athens, GA.
- *Hauseman, D. C. (2016). Youth-led community arts hubs: self-determined learning in an out-of-school time (OST) program. *Cogent Educ.*, 3:1210492. doi: 10.1080/2331186X.2016.1210492
- Hutchinson, J., and Kettlewell, K. (2015). Education to employment: complicated transitions in a changing world. *Educ. Res.* 57, 113–120. doi: 10.1080/00131881.2015.1030848
- ILO. (2021). Global framework on core skills for life and work in the 21st century. International Labour Organization. Available at: https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_813222.pdf
- Jansen, R. S., van Leeuwen, A., Janssen, J., Conijn, R., and Kester, L. (2020). Supporting learners' self-regulated learning in massive open online courses. *Comput. Educ.* 146:103771. doi: 10.1016/j.compedu.2019.103771
- *Jansen, R. S., van Leeuwen, A., Janssen, J., and Kester, L. (2018). Validation of the revised self-regulated online learning questionnaire. In V. Pammer-Schindler, M. Pérez-Sanagustín, H. Drachler, R. Elferink and M. Scheffel (Eds.), Lifelong technology-enhanced learning EC-TEL 2018. Lecture Notes in Computer Science, (Springer International Publishing) pp. 116–121.
- Jongbloed, J., and Giret, J. F. (2021). Untangling the roles of low skill and education in predicting youth NEET statuses: negative signalling effects in comparative perspective. *Compare J. Compar. Int. Educ.* 53, 674–692. doi: 10.1080/03057925.2021.1951664
- Jossberger, H., Brand-Gruwei, S., Boshuizen, H., and van de Wiel, M. (2010). The challenge of self-directed and self-regulated learning in vocational education: a theoretical analysis and synthesis of requirements. *J. Vocat. Educ. Train.* 62, 415–440. doi: 10.1080/13636820.2010.523479
- *Keane, C. A., Miller, L. M., Eady, M. J., and Green, C. A. (2022). SETTLE DOWN: preliminary investigations and development of an online toolkit to support student self-regulation in higher education. *Front. Educ.*, 7, 1–13. doi: 10.3389/feduc.2022.957328
- Knowles, M. (1975). Self-directed learning. A guide for learners and teachers. Englewood Cliffs: Prentice Hall/Cambridge.
- Köiv, K., and Saks, K. (2023). The role of self-directed learning while supporting NEET-youth: theoretical model based on systematic literature review. *Int. J. Adolesc. Youth.* 28:2242446. doi: 10.1080/02673843.2023.2242446
- Köiv, K., and Saks, K. (2024). Development of an instrument to measure NEET-youth self-learning skills. *Int. J. Adolesc. Youth.* 29:2306256. doi: 10.1080/02673843.2024.2306256
- Köiv, K., Saks, K., Paabort, H., Lendzhova, V., and Smoter, M. (2022). A service model for self-directed learning of NEET youth at the local government level. *Youth Soc.* 54, 52S–68S. doi: 10.1177/0044118X211058225
- Mawn, L., Oliver, E. J., Akhter, N., Bamba, C. L., Torgerson, C., Bridle, C., et al. (2017). Are we failing young people not in employment, education or training (NEETs)? A systematic review and meta-analysis of re-engagement interventions. *Syst. Rev.* 6:16. doi: 10.1186/s13643-016-0394-2
- *Mbagwu, F. O., Chukwuedo, S. O., and Ogbuanya, T. C. (2020). Promoting lifelong learning propensity and intentions for vocational training among adult and vocational educational undergraduates. *Vocat. Learn.*, 13, 419–437. doi: 10.1007/s12186-020-09245-1
- *Mejeh, M., and Held, T. (2022). Understanding the development of self-regulated learning: an intervention study to promote self-regulated learning in vocational schools. *Vocat. Learn.*, 15. doi: 10.1007/s12186-022-09298-4, 531–568
- *Minnaert, A., Prince, A., and Opdenakker, M. C. (2017). The effect of self-regulated strategy instruction and behavioral consultation on motivation: a longitudinal study on the effect of school-based interventions in secondary education. *Front. Educ.*, 2:61. doi: 10.3389/feduc.2017.00061
- Moher, D., Liberati, A., and Altman, D. G. The PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med.* 6, e1000097–e1000096. doi: 10.1371/journal.pmed.1000097
- *Morris, T. H. (2019). Self-directed learning: a fundamental competence in a rapidly changing world. *Int. Rev. Educ.*, 65, 633–653. doi: 10.1007/s11159-019-09793-2
- Morris, T. H. (2023). Four dimensions of self-directed learning: a fundamental Meta-competence in a changing world. *Adult Educ. Q.* doi: 10.1177/07417136231217453
- *Morris-Eyton, H., and Pretorius, E. (2023). Cultivating a digital promise: promoting reflective and reflexive activities to enhance self-directed learning for the 21st century. A practice report'. *Student Success*, 14, 88–99. doi: 10.5204/ssj.2659
- Paabort, H., Flynn, P., Beilmann, M., and Petrescu, C. (2023). Policy responses to real world challenges associated with NEET youth: a scoping review. *Front. Sustain. Cities* 5, 1–16. doi: 10.3389/frsc.2023.1154464
- Parola, A., Marcionetti, J., Sica, L. S., and Donsi, L. (2023). The effects of a non-adaptive school-to-work transition on transition to adulthood, time perspective and internalizing and externalizing problems. *Curr. Psychol.* 42, 25855–25869. doi: 10.1007/s12144-022-03605-x
- Patterson, J. (2011). "Metacognitive Skills" in Encyclopedia of clinical neuropsychology. eds. J. S. Kreutzer, J. DeLuca and B. Caplan (New York, NY: Springer), 1583–1584. doi: 10.1007/978-0-387-79948-3_897

- *Payne, S. (2021). Using an E-portfolio system to evaluate student learning outcomes and to Foster more self-direction within the curricula. *Int. J. Self-Directed Learn.*, 18, 1–9.
- Rahmani, H., and Groot, W. (2023). Risk factors of being a youth not in education, employment or training (NEET): a scoping review. *Int. J. Educ. Res.* 120:102198. doi: 10.1016/j.ijer.2023.102198
- Ralston, K., Everington, D., Feng, Z., and Dibben, C. (2022). Economic inactivity, not in employment, education or training (NEET) and scarring: the importance of NEET as a marker of long-term disadvantage. *Work Employ. Soc.* 36, 59–79. doi: 10.1177/0950017020973882
- *Randall, J. G., Hanson, M. D., and Nassrelrgawi, A. S. (2022). Staying focused when nobody is watching: self-regulatory strategies to reduce mind wandering during self-directed learning. *Appl. Psychol.*, 71, 1428–1464. doi: 10.1111/apps.12366
- Ripamonti, E. (2023). School-to-work transition: putting non-cognitive skills in context. The case of NEET and suggestions for policy. *Int. J. Educ. Vocat. Guidance.* doi: 10.1007/s10775-023-09635-6
- *Schweder, S., and Raufelder, D. (2019). Positive emotions, learning behavior and teacher support in self-directed learning during adolescence: do age and gender matter? *J. Adolesc.*, 73, 73–84. doi: 10.1016/j.adolescence.2019.04.004
- *Schweder, S., and Raufelder, D. (2021). Needs satisfaction and motivation among adolescent boys and girls during self-directed learning intervention. *J. Adolesc.*, 88, 1–13. doi: 10.1016/j.adolescence.2021.01.007
- Schweder, S., and Raufelder, D. (2022). Adolescents' enjoyment and effort in class: influenced by self-directed learning intervals. *J. Sch. Psychol.* 95, 72–89. doi: 10.1016/j.jsp.2022.09.002
- Stein, T. H., Bertelsen, T. B., Fegran, L., Sejersted, E., Kleppang, A. L., and Fyhn, T. (2024). Interventions targeting young people not in employment, education or training (NEET) for increased likelihood of return to school or employment—a systematic review. *PLoS One* 19:e0306285. doi: 10.1371/journal.pone.0306285
- *Stephen, J. S., and Rockinson-Szapkiw, A. J. (2021). A high-impact practice for online students: the use of a first-semester seminar course to promote self-regulation, self-direction, online learning self-efficacy. *Smart Learn. Environ.*, 8:6. doi: 10.1186/s40561-021-00151-0
- Valiente, O., Capsada-Munsech, Q., and de Otero, G. (2020). Educationalisation of youth unemployment through lifelong learning policies in Europe. *Eur. Educ. Res. J.* 19, 525–543. doi: 10.1177/1474904120908751
- *Van Tonder, G. P., Kloppers, M. M., and Grosser, M. M. (2022). Enabling self-directed academic and personal wellbeing through cognitive education. *Front. Psychol.*, 12, 6332. doi: 10.3389/fpsyg.2021.789194
- *Wandler, J. B., and Imbriale, W. J. (2017). Promoting undergraduate student self-regulation in online learning environments. *Online Learn.*, 21, 1–16. doi: 10.24059/olj.v21i2.881
- *Wolff, M., Stojan, J., Buckler, S., Cranford, J., Whitman, L., Gruppen, L., et al. (2020). Coaching to improve self-directed learning. *Clin. Teach.*, 17, 408–412. doi: 10.1111/tct.13109
- *Wong, F. M., and Kan, C. W. (2022). Online problem-based learning intervention on self-directed learning and problem-solving through group work: a waitlist controlled trial. *Int. J. Environ. Res. Public Health*, 19, 720. doi: 10.3390/ijerph19020720
- Yates, S., and Payne, M. (2006). Not so NEET? A critique of the use of 'NEET' in setting targets for interventions with young people. *J. Youth Stud.* 9, 329–344. doi: 10.1080/13676260600805671