Co-funded by
the European Union

REPORT ON THE INTEGRATED AND INTERACTIVE TRAINING OF AUTISTIC INDIVIDUALS

by: Learn Virtual Europe

Project 2023-1-HR01-KA220-VET-000157245

Co-funded by the European Union

Contents

Simulated job interviews offer neurodivergent learners a safe space to build confidence, prepare responses, and become familiar with interview dynamics without the high stakes of a real interaction. These simulations can include pre-recorded avatars or live mock sessions, providing options for learners to choose their pace, rehearse common questions, and receive personalized feedback. Scenarios can be repeated multiple times with increasing complexity, helping learners become comfortable with self-presentation, eye contact, timing, and responding to unexpected queries. These practice sessions also help reduce anxiety around unfamiliar social

Abstract

Simulation-based vocational training for autistic individuals provides structured, predictable, and sensory-friendly environments that support skill development, emotional regulation, and confidence building. Key principles include individualization, clear instruction, immediate feedback, sensory considerations, and communication skill support. Progress is measured through a combination of performance metrics, engagement levels, and learner reflections. A supportive ecosystem—including trainers, job coaches, therapists, and family—reinforces learning and skill transfer. Simulation typically covers 30–80% of the overall training depending on the profession, offering a safe space for practice before moving to real-world settings. This blended approach allows for tailored pacing, reduces anxiety, and supports successful, sustainable employment outcomes through stepwise, scaffolded learning.

Introduction

Training autistic individuals with simulators in vocational education requires **a thoughtful blend of inclusive pedagogy, evidence-based practices, and technology design tailored to neurodiverse learners**.

Simulators can provide:

- **Predictable and controlled environments**, which reduce anxiety and sensory overload.
- **Repeated practice opportunities**, essential for skill acquisition and confidence building.
- **Immediate feedback**, supporting learning through clear cause-effect relationships.
- **Safe spaces to fail and learn**, without real-world consequences.
- **Customizable difficulty levels**, allowing individualized pacing.

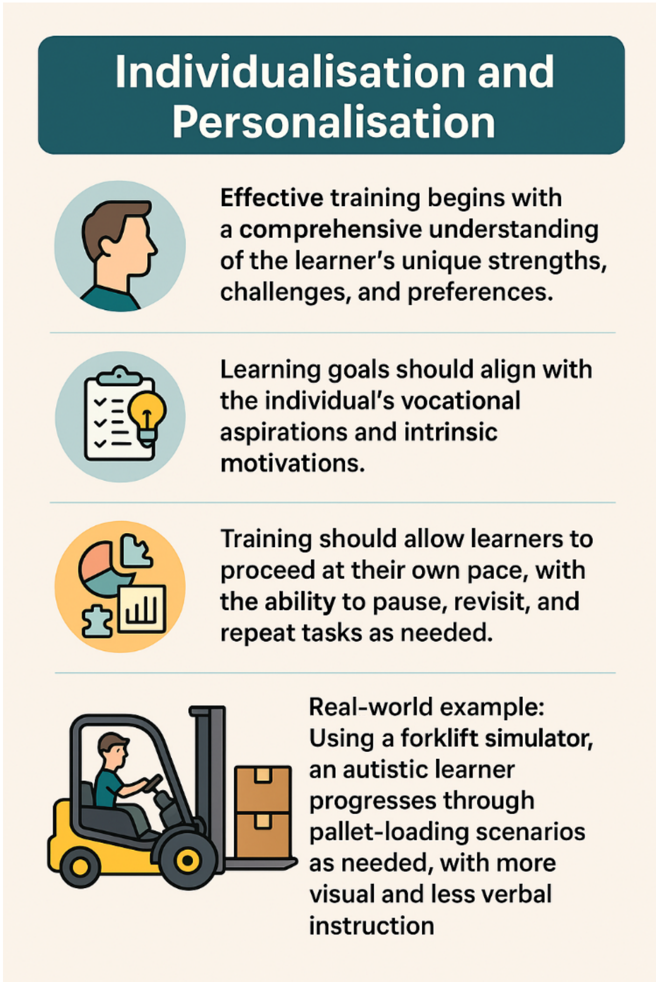
Guiding Principles

Simulation-based training for autistic individuals is most effective when it integrates five core principles: individualization and personalization, sensory-friendly design, clear instruction, immediate feedback, and communication skill support. These pillars serve as the foundation for creating inclusive, engaging, and empowering learning environments.

Integrating simulation-based training into vocational education for autistic individuals requires careful optimization of the balance between simulated and real-world practice. This balance varies across professions and should be tailored to the specific demands of each field. Below are the key principles incorporating real-world estimates of simulation versus real equipment training ratios for selected professions.

1. Individualization and Personalization

Effective training begins with a comprehensive understanding of the learner's unique strengths, challenges, and preferences. A holistic assessment—including cognitive capabilities, sensory profiles, and emotional regulation patterns—lays the foundation for tailoring the experience. Identifying areas of strength and interest, such as detail orientation, systematic thinking, and visual learning, is crucial. Learning goals should align with the individual's vocational aspirations and intrinsic motivations. For instance, if a learner shows interest in systems and order, logistics-related simulations may be particularly engaging. Training should allow learners to proceed at their own pace, with the ability to pause, revisit, and repeat tasks as needed, fostering comprehension and confidence.



Real-world example: A young adult with autism who has strong pattern recognition skills and an interest in machinery enrolls in forklift operation training. Using a forklift simulator, they progress through various levels, repeating pallet-loading scenarios as needed. Their program is personalized to include more visual instruction and less verbal guidance, aligning with their processing preferences. In forklift training programs, simulation-based training can constitute approximately 60-70% of the curriculum, with the remaining 30-40% involving hands-on practice with real equipment.

This blend ensures that learners develop both theoretical understanding and practical skills in a controlled environment.

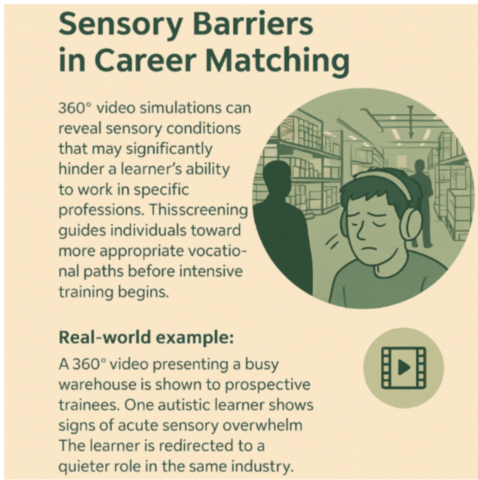
---

2. Sensory-Friendly Design

Considering sensory sensitivities is essential in simulation environments for autistic individuals. Simulations should minimize visual and auditory overload by avoiding flashing lights, rapid transitions, crowded layouts, and loud or high-pitched sounds. Interfaces should feature clean visuals, soft colours, and smooth, predictable animations. Adjustable settings allowing users to personalize aspects like brightness, volume, and haptic feedback are important. Integrating planned sensory breaks—such as calming intermissions, nature-inspired visuals, or guided breathing animations—helps prevent overstimulation, enabling learners to self-regulate and maintain engagement.

Real-world example: In a car painting simulator, a learner sensitive to high-pitched sounds and bright lights benefits from a low-stimulation mode, muting sudden spray noises and dimming screen contrast. After each spraying practice, the system prompts the learner to take a break with a soft ambient animation and breathing guide before continuing. In automotive painting training, simulation might comprise about 60-70% of the training, with 30-40% dedicated to real-world practice. This ratio allows learners to build foundational skills in a controlled setting before transitioning to hands-on experience.

Using Videos to Identify Sensory Barriers in Career Matching



While simulation environments often aim to reduce sensory stimuli to create a more comfortable and manageable learning experience, it's equally important to use immersive technologies—such as 360° video simulations—to evaluate whether certain sensory conditions may significantly hinder a learner's ability to work in specific professions. This approach supports early identification of individual limitations in real-world environments without placing learners at risk. For example, if a simulation replicates the noise, pace, or visual complexity of a factory floor and a learner exhibits severe distress or disorientation, it may indicate that the setting is unsuitable for their long-term well-being. This helps training programs and support teams guide individuals toward more appropriate vocational paths before intensive training begins, reducing dropout rates and preventing future workplace challenges. Such screening is not about exclusion but about ethical alignment between personal sensory profiles and work environment demands.
Work Package 3 offers several 360° videos in this project.

Real-world example: A 360° video presenting a busy warehouse is shown to prospective trainees. One autistic learner shows signs of acute sensory overwhelm during the viewing, including visible discomfort and loss of focus. Based on this response—and a follow-up discussion—the learner is redirected toward a lab-based quality control role in the same industry, which offers a quieter, more structured setting better suited to their profile.

---

3. Clear Instructions and Structured Scenarios

Clarity and structure are vital when presenting tasks in a simulator. Learners benefit from step-by-step instructions supported visually and, where appropriate, through narration. Text paired with icons or short videos helps communicate expectations clearly, reducing reliance on verbal processing alone. Tasks should be broken down into manageable components, progressing from simple to more complex activities in a logical sequence. Simulations should offer opportunities for learners to observe demonstrations through “watch mode,” video tutorials, or guided avatars modeling each step. Predictability and repeatability of structured scenarios support comprehension and task mastery.

Real-world example: A lab assistant simulator begins with a short, animated walkthrough of measuring and pipetting a chemical substance. The learner then moves through colour-coded steps—measuring, pipetting, labelling—each broken into separate simulation rounds. The option to replay the demonstration video before each attempt reinforces learning. In laboratory technician training, virtual laboratory simulations can effectively replace up to 20-30% of traditional hands-on training, allowing students to familiarize themselves with procedures before engaging with actual laboratory equipment. citeturn0search7

---

4. Consistent and Immediate Feedback

Feedback in simulation-based training must be timely and supportive. Emphasizing correct actions and offering specific, constructive guidance for improvement is crucial. Instead of vague error messages, feedback should clearly indicate what needs adjustment, such as “You missed Step 3—placing the barcode correctly.” Reinforcing successful elements like “Great attention to detail in shelf alignment” boosts motivation. Feedback should be delivered in a format aligning with the learner’s preference, whether visual, written, or spoken. Incorporating gamified elements such as progress bars, badges, or streaks can enhance engagement and provide tangible markers of progress. As a general rule, objective and clear feedback works best – for example a simulated replay video showing what went good and what went wrong.

Real-world example: During a production line control simulation, a learner receives immediate visual feedback when a machine temperature exceeds safety thresholds. The simulator highlights the specific control missed and provides a corrective hint, while also reinforcing successful areas such as accurate timing and consistent monitoring. Awarding a badge after five successful rounds boosts the learner’s motivation. In manufacturing training, simulations might account for 30-50% of the training program, with the remainder involving real equipment to ensure comprehensive skill development.

---

5. Support for Social and Communication Skills

Simulators can significantly foster social understanding and communication skills, particularly in customer service or teamwork scenarios. Virtual interactions allow learners to practice responding to various social cues, manage emotional responses, and navigate conversations in a low-stress environment. Using pre-recorded avatars or AI-generated dialogue trees, learners can explore different communication paths and reflect on outcomes. To support communication, especially for those with limited verbal abilities, simulations should offer visual scripts or prompt cards outlining key phrases and sentence structures. These scaffolding tools can be used before, during, and after simulated interactions, allowing learners to build and customize their preferred phrases over time. Emotional regulation tools, such as in-simulation calming options or reflection prompts after stressful interactions, further enhance the learner's ability to generalize skills into real-world contexts.

Real-world example: In a customer service simulation set in a logistics hub, an autistic learner is prompted to greet a virtual customer and resolve a delivery issue. Before the scenario, they review visual prompt cards with phrases like "How can I help you today?" and "Let me check on that for you." The scenario allows the learner to choose dialogue options and observe outcomes. After the interaction, the simulator offers a reflection screen with emojis to express how the situation felt, along with a calming breathing animation to conclude the session. In customer service training, simulations may comprise approximately 30-40% of the training, with the majority focusing on real-life interactions to build practical experience.

By integrating these principles and optimizing the balance between simulation and real-world training based on industry standards and the specific needs of autistic learners, vocational education programs can create effective, personalized, and supportive learning environments that facilitate skill development and successful employment outcomes.

Learner-Centric Design Flow for Simulation-Based Skill Development in Autistic Individuals

The learner-centric design flow is a structured approach that places the autistic individual at the centre of the training journey. It integrates tailored assessments, personalized instruction, adaptive simulation tools, and real-world transition supports. The model is composed of five sequential yet interrelated phases: Initial Assessment, Simulator Onboarding, Skill Development, Progress Evaluation, and Real-World Transfer.

1. Initial Assessment

The training process begins with a comprehensive initial assessment aimed at understanding the learner's unique profile. This includes the identification of strengths, such as pattern recognition or attention to detail, which can be leveraged during training. It also involves a careful exploration of sensory sensitivities, such as aversion to noise, bright lights, or specific textures, which may influence how simulations should be presented. Additionally, the assessment phase gathers information on the learner's interests and motivational factors. This information is critical for designing engaging scenarios that align with the individual's preferences. The assessment process typically involves structured interviews with the learner and caregivers, the use of standardized instruments (e.g., ADOS-2, Vineland Adaptive Behaviour Scales), and direct observation protocols to build a detailed learner profile.

2. Simulator Onboarding

Following the assessment, the onboarding phase introduces the learner to the simulation environment in a supportive and low-pressure manner. The interface design prioritizes simplicity and clarity, using consistent navigation elements, visual cues, and optional voice instructions to accommodate varying communication needs. Learners are guided through practice modules that demonstrate basic interactions with the simulator. These modules may include video modeling or step-by-step walkthroughs of the simulator's functionality. The onboarding period allows learners to familiarize themselves with the virtual setting through low-demand tasks and exploratory interactions, helping to reduce anxiety and build confidence before advancing to task-specific learning.

3. Skill Development

The core of the training process is focused on skill development. During this phase, learners engage in practice cycles using structured, task-specific simulations that mirror the demands of real vocational activities. Tasks are segmented into manageable steps, enabling learners to focus on one skill element at a time. Immediate feedback is an integral component, provided through clear visual or auditory indicators that reinforce correct responses and gently guide correction of errors. The simulation environment is designed to be adaptive, allowing tasks to increase in complexity or remain simplified based on the learner's pace and performance. The structured repetition of tasks facilitates learning while accommodating the need for predictability and routine often valued by autistic individuals.

4. Progress Evaluation

Progress evaluation is essential for monitoring learner growth and guiding instructional decisions. This phase collects both quantitative and qualitative data to create a holistic view of the learner's advancement. Quantitative metrics may include task completion time, accuracy rates, frequency of errors, and number of prompts required. These data points are used to track skill acquisition over time. In parallel, qualitative observations capture behavioural indicators such as engagement, frustration tolerance, and ability to follow instructions. Learners who can articulate their experiences may also be encouraged to reflect on what they found easy, challenging, or enjoyable. The insights gathered during this phase inform adjustments to the simulation settings, instructional supports, and determine readiness for real-world application.

5. Real-World Transfer

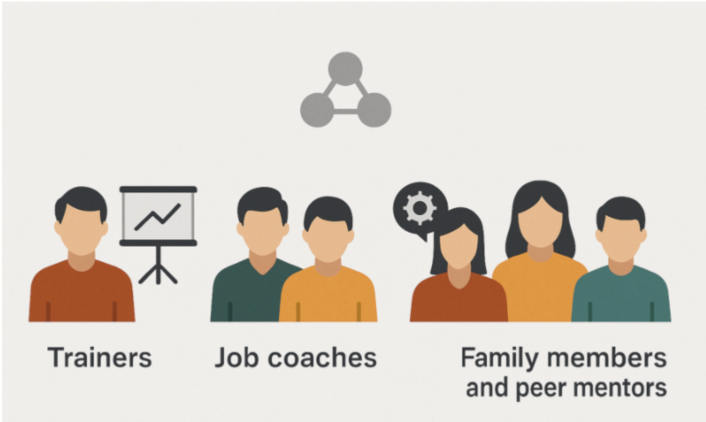
The final phase of the learner-centric flow focuses on facilitating the transition from virtual training to real-world implementation. This is achieved through carefully structured experiences such as internships, site visits, or short-term placements in environments that reflect the contexts practiced in the simulations. Real-world transfer is supported by job coaches or mentors who assist learners in applying their skills in authentic settings. These professionals also provide social and emotional support as learners adapt to new routines and expectations. Efforts are made to ensure consistency between the simulated tasks and real job requirements, such as using similar tools, workflows, and terminologies. Feedback from the learner and workplace staff is collected to evaluate the effectiveness of the transition and to identify areas where additional support or simulation refinement is needed.

In summary, the learner-centric design flow offers a comprehensive, flexible, and evidence-informed pathway for developing practical skills in autistic individuals. By integrating assessment, adaptive simulation, progress monitoring, and real-world exposure, this model supports both skill mastery and meaningful community participation.

Co-funded by the European Union

Involving Support Systems

The success of simulation-based vocational training for autistic individuals depends significantly on the **active involvement of a support network** that includes trainers, job coaches, therapists, and, where appropriate, family members and peers. These individuals play distinct yet complementary roles in ensuring that learners not only perform well in simulated environments but also **transfer their skills confidently and sustainably into real-world contexts**.



Trainers and vocational educators are often the first point of contact within the learning environment. They are responsible for guiding learners through the simulation, introducing new tasks, and adapting instructional strategies to match individual learning styles. Trainers should receive **specialized training themselves** in neurodiversity and inclusive teaching methods. Their role extends beyond simply facilitating the simulation; they must also recognize when a learner is struggling due to sensory overload, anxiety, or communication barriers and respond with empathy and practical support.

Job coaches serve as critical bridges between the simulation space and actual work environments. Their primary responsibility is to support **generalization of skills**, which refers to the learner's ability to perform learned behaviours outside the training setting. Job coaches may observe simulation sessions to identify strengths and support needs, and then accompany learners during internships, workplace visits, or trials. They can advocate for reasonable accommodations, help break down real-world tasks into manageable steps, and reinforce skills through **coaching in context**.

Therapists, particularly occupational and behavioural therapists, contribute by ensuring that **the simulator environment aligns with the learner's sensory profile, motor coordination abilities, and emotional regulation needs**. They can offer insights on optimal session lengths, pacing strategies, and environmental adaptations (e.g., lighting, sound levels, or interface design). Collaboration between therapists and simulation designers ensures that the training is not only pedagogically sound but also neurologically supportive.

Family members and peer mentors provide continuity and emotional reinforcement outside the formal learning space. When involved appropriately, they can **help learners practice new skills at home**, offer reminders or encouragement, and validate progress. Peer mentors, especially those who have completed similar training, can model success, reduce feelings of isolation, and normalize challenges, making the learning process more socially grounded and motivating.

Together, this ecosystem of support creates a **scaffolded, wraparound learning environment** that respects the individuality of each learner while promoting the ultimate goal: meaningful, sustainable employment.

Co-funded by the European Union

Measuring Progress

Tracking progress in simulation-based vocational training requires a **multi-dimensional approach** that captures not only task performance but also learner engagement, emotional confidence, and growth over time. Because autistic learners may progress in **nonlinear or subtle ways**, it is essential to combine **quantitative indicators with qualitative insights**.

First, programs should employ **observable behavioural benchmarks**. These might include metrics such as task completion rate, the number of prompts or cues required during a session, and error frequency. For example, a learner who initially needs verbal and visual prompts to complete a forklift safety check might later complete the same task independently—a measurable sign of learning. These observations should be logged consistently, ideally with video or digital tracking within the simulator software.

In addition to performance, it is important to **monitor levels of engagement** and **learner-reported confidence**. This can be done using Likert-scale self-assessments ("How confident do you feel about this task today?"), visual emotion trackers (e.g., selecting emojis), or observational checklists completed by instructors. A learner who shows increased willingness to initiate tasks, spends longer periods in simulation, or exhibits reduced avoidance behaviours is demonstrating real progress—even if task scores remain stable.

Equally critical are **qualitative feedback sessions** conducted after each simulation module. These should be safe, structured conversations where learners can express how they felt, what they found easy or difficult, and what kind of support they believe would help. Trainers and job coaches can use this information to adjust strategies and reinforce learner agency. Where verbal expression is limited, alternative methods such as pictorial surveys, storytelling, or video diaries may be used.

When combined, these tools provide a **holistic view of progress** that respects both neurodiversity and individual learning trajectories. Such data is not only useful for tracking achievement but also for building learner confidence and informing individualized support plans.

Good Practice Example

A vocational training centre uses a **virtual laboratory simulator** to support autistic learners preparing for lab technician roles. The simulator guides students through structured tasks such as **measuring liquids, labelling test tubes, and performing simple experiments**, all presented with **visual prompts and narrated instructions**. Each task is broken down into discrete, repeatable steps to ensure predictability and clarity. Learners can practice procedures multiple times with **immediate, constructive feedback** that highlights both correct actions and areas for improvement. The simulation also includes a “watch mode,” allowing learners to preview tasks before trying them. A **job coach monitors progress**, offers encouragement, and later facilitates real-world practice sessions in a physical lab environment to support skill transfer and workplace readiness.

Blending Simulation and Real-World

Integrating simulation into vocational education and training (VET) alongside real tools and environments offers a powerful pathway for supporting neurodivergent learners, especially those on the autism spectrum. This integration must be carefully designed to bridge virtual learning with hands-on experience in a way that respects diverse cognitive profiles, sensory sensitivities, and communication needs. Work Package 2 will refer to the specific skills necessary for teachers in detail. The main topics relevant here are summarized below.

A blended learning model begins with simulations that introduce theoretical knowledge and allow learners to safely practice tasks without real-world consequences. These controlled environments help reduce anxiety, foster predictability, and support confidence building. As learners progress, real-world practice is introduced gradually, ensuring they have the necessary familiarity and emotional readiness to engage with actual equipment and dynamic settings.

Example: *In a forklift operator training program, autistic learners begin with a simulator that adjusts the complexity of loading tasks to individual comfort levels. Only after completing several successful trials they transition to supervised hands-on practice in a warehouse environment.*

Inclusive Group Dynamics and Instructional Strategies

In group or classroom contexts, inclusive strategies are essential. Grouping should be flexible, enabling both collaborative and independent work depending on the learner's social comfort. Instructors must implement universally designed instruction that accommodates varied learning styles through visual aids, concrete language, and multiple methods of engagement. Predictable routines, clearly communicated expectations, and visual schedules contribute to emotional regulation and task comprehension. Peer mentoring, when thoughtfully introduced, can provide valuable modelling and support without pressure.

Example: *In a vocational lab assistant course, learners may rotate between individual tasks and paired activities, with trained peers helping to reinforce instructions using shared visual checklists.*

Sensory-Safe and Accessible Learning Environments

The physical and sensory environment of both simulated and real-world settings must also be considered. Reducing harsh lighting, managing noise levels, and offering quiet retreat areas can significantly improve engagement for neurodivergent learners. Tools should be labeled with clear icons or color codes, and simulator interfaces must be intuitive and customizable for brightness, volume, or haptic feedback. Built-in emotional regulation tools such as calming breaks, guided breathing, or soft visual transitions can help learners manage stress and maintain focus.

Example: *In an automotive painting module, a learner may use a low-stimulation mode that dims the screen and mutes abrupt spray sounds, followed by a short relaxation animation after each round of practice.*

The Role of Educators and Trainers in Inclusive VET

Educators and trainers play a central role in the success of this model. They must understand neurodiversity-related needs such as sensory sensitivities, executive functioning challenges, and communication differences. Instructors should be trained to deliver content in multiple formats, break tasks into manageable steps, and respond supportively to signs of stress or overload. They also need to be proficient with simulation platforms, capable of adapting difficulty levels and analyzing learner progress through embedded metrics.

Example: *In a welding course, an instructor introduces students to a flatscreen motion tracking tool that teaches proper angle control and movement patterns. For a learner who processes visual cues better than verbal ones, the instructor plays back the movements to highlight hand position errors with animated overlays instead of spoken corrections. Once the learner consistently performs at a set accuracy level, they gradually transition to virtual welding simulations and then to actual welding stations with the same instructor modelling the procedure again—this time in-person with simplified verbal or visual cues.*

Organizational Infrastructure and Policy Considerations

At the institutional level, VET providers must embed inclusion into policies and planning. This includes aligning simulation-based content with professional standards and competency frameworks, ensuring simulations are used to enhance—not replace—practical skill-building. Resources must be allocated to maintain equipment, train staff, and involve professionals such as occupational therapists or educational psychologists in the instructional design process.

Example: *In a multi-trade training centre, onboarding procedures may include a sensory profile screening, allowing personalized adaptations to simulation and workshop environments from the outset.*

Facilitating Real-World Transfer through Scaffolded Experiences

The transition from simulation to real environments should be structured and supported. Simulation scenarios can mirror workplace situations such as client interactions, technical troubleshooting, or safety drills. These experiences help learners rehearse for authentic challenges in low-risk contexts. Internships and site visits should follow this preparation, ideally supported by job coaches who understand the training content. After completing a real-world placement, learners might revisit the simulator to reflect on what worked, what was difficult, and how they adapted.

Example: *A learner in a customer service program might practice handling complaints with a virtual avatar, then role-play a real scenario with a supervisor, followed by a guided reflection.*

Blending Job Interviews

Simulated job interviews offer neurodivergent learners a safe space to build confidence, prepare responses, and become familiar with interview dynamics without the high stakes of a real interaction. These simulations can include pre-recorded avatars or live mock sessions, providing options for learners to choose their pace, rehearse common questions, and receive personalized feedback. Scenarios can be repeated multiple times with increasing complexity, helping learners become comfortable with self-presentation, eye contact, timing, and responding to unexpected queries. These practice sessions also help reduce anxiety around unfamiliar social expectations by incorporating visual prompts or structured scripts. Colleguages in Work Package 3 produced a simulation helping neurodivergent people.

Example: *A learner preparing for a warehouse logistics role participates in a simulated job interview where a virtual interviewer asks standard questions like "Tell me about yourself" and "How do you handle pressure?" Up to the training logic, the learner may answer directly or selects from multiple response options, practices tone and pacing. From the teacher or trainer, the learner may receive immediate feedback such as "Try to mention your key strength earlier." After several rounds, the learner switches to a live mock interview with a coach, using visual cue cards created during the simulation phase to support fluency and reduce stress.*

Monitoring Progress and Supporting Emotional Safety

Monitoring must be both quantitative and qualitative. Simulation platforms can track task completion time, error frequency, and decision accuracy. At the same time, trainers should observe emotional regulation, frustration tolerance, and social interaction patterns. Learners can be invited to reflect on their experiences using visual tools, emotion charts, or written journals. Emotional safety also means allowing learners to opt out of distressing content or data recording.

Example: *A learner who found visual feedback overwhelming was given a summary sheet highlighting their improvements instead of watching video replays, which reduced anxiety while still supporting growth.*

Responding to Emotional Overload and Meltdowns

Emotional overload and meltdowns are real possibilities in vocational settings, especially when neurodivergent learners encounter unexpected changes, sensory overload, or communication breakdowns. Educators and staff must recognize early signs of distress—such as withdrawal, repetitive behaviours, increased vocalizations, or visible agitation—and intervene with empathy and clarity. Responding effectively involves de-escalating the situation without drawing unnecessary attention, offering a calm and quiet space, and using pre-agreed coping strategies such as sensory tools, visual supports, or brief movement breaks. It's essential to avoid punitive reactions and instead frame these moments as signals for support and adjustment. Establishing individualized meltdown response plans, co-designed with the learner, their support team, and family if appropriate, ensures that responses are respectful, consistent, and grounded in trust.

Example: *During a group session in a simulated retail environment, a learner becomes overwhelmed by a sudden increase in noise and task demands. The trainer calmly redirects the learner to a quiet room without verbal pressure, using a visual card the learner previously selected as a signal for needing a break. After a short self-regulation period using a noise-cancelling headphones, the learner may choose to return to the simulation, supported by a simplified task version to rebuild confidence.*

Toward Sustainable Inclusion and Employment Outcomes

Integrating simulation with real-world training in VET for neurodivergent learners requires a thoughtful, inclusive, and systemic approach. From adapting classroom practices and simulation design to equipping educators and reshaping institutional policies, every element should contribute to a supportive, flexible learning experience. When this integration is done well, learners not only build technical skills but also gain confidence, resilience, and a sense of agency—enabling them to step into the workforce with both competence and dignity.

Example: *A former trainee in a groundskeeping program can be transitioned into full-time employment after mastering equipment use through simulations, supported by a consistent coach and workplace mentor. This success can be made possible by the surrounding ecosystem of tailored support.*

Structured Simulation Approaches for Autistic Learners Across Vocational Fields

Training with simulation begins with flat-screen tools to build coordination and concentration—core skills across all professions. Already used in Hungarian vocational schools, this approach suits autistic learners by enabling gradual progress. In welding, basic motion training is followed by a job-specific simulator. Starting with flat-screen simulations eases the transition to VR, supports safe, cost-efficient training, and allows repetition without added expense. We recommend this two-step method—flat-screen first, then job-specific—for all fields, making it a valuable foundation for autistic learners in any vocational path.

---

1. **Welding**
   Key strengths: high attention to detail, comfort with routine and repetition, strong focus when interested.
   Simulation goals: develop hand-eye coordination and manual dexterity, foster concentration and task persistence, teach safety protocols in a controlled environment.
   Training tips: use flat-panel solutions first to learn basic welding movements, then develop fine-grained movements, welding machine settings and correct welding parameters with realistic XR welding simulators; offer structured task progression from basic welds to complex joints; provide visual feedback such as heat maps and arc settings; include built-in scoring for skill acquisition.

2. **Car Painting**
   Key strengths: precision, sensory awareness, visual attention to surface and colour details.
   Simulation goals: familiarize with various common surface cleaning and coating technologies that can be performed using spray techniques, ideal settings of spray painting machines and different spray guns, teach paint layering techniques and masking, reinforce cleanliness and safety guidelines, practice fine motor control.
   Training tips: use XR environments with realistic spray painting simulators; provide step-by-step visual instructions with colour coding; provide feedback on paint thickness and coverage, display non-conformities such as damage on the surface, or orange peel, dry spray, and drips; offer options to mute audio or adjust haptics to address sensory sensitivity.

3. **Logistics (Physical & Cognitive Tasks)**
   Key strengths: process-oriented thinking, comfort with routines and systematized workflows.
   Simulation goals: teach warehouse navigation and item picking, strengthen data entry and inventory software use, foster procedural memory through checklists, tagging, and scanning.
   Training tips: simulate warehouse layouts for shelf stocking, picking, and sorting;

include barcode scanning and digital logistics platforms; use game-based feedback for correct vs. incorrect placements; enable task repetition in quiet, distraction-free settings.

4. **Forklift Operation**
   Key strengths: Individuals with strong spatial awareness, a preference for structure, and a natural tendency to follow rules and prioritize safety are particularly well-suited for forklift operation. Their ability to remain attentive to procedures and environmental cues supports safe and efficient task execution.

   Simulation goals: The primary objectives of forklift simulation training include familiarizing learners with the components of the forklift and their functions, mastering movement and operational controls, and safely navigating confined or complex spaces. Additional goals involve developing precise loading and unloading techniques, enhancing situational awareness—particularly regarding blind spots and shared zones with pedestrians—and practicing the delivery of various goods in dynamic work environments alongside other workers.
   Training tips: Start with flat-screen simulators that offer adjustable levels of difficulty, allowing learners to progress at their own pace. Structure the training into clear operational segments: starting, driving, lifting, lowering, and parking. Incorporate pre-operation safety routines, such as seat checklists and hazard awareness modules. To reinforce learning and support ongoing assessment, integrate visual and auditory alerts, along with performance dashboards or learning management tools like Vulcan to monitor progress and provide targeted feedback.

5. **Truck / Bus Driver**
   Key strengths: preference for independent tasks, high adherence to rules and structured routines.
   Simulation goals: familiarize with the main parts of the vehicle and how to operate them, learn route navigation and traffic rules, practice vehicle handling in different weather or traffic and road conditions, develop knowledge of pre-trip inspections and loading protocols.
   Training tips: use motion based XR simulators with flat-screen solution first, and then realistic cockpit in 100% VR with adjustable sensory stimuli; create routines for route planning, vehicle inspections, and rest/meal breaks.

6. **Heavy Machinery Operator**
   Key strengths: comfort with routine-heavy tasks, ability to focus for long periods.
   Simulation goals: develop multi-arm coordination skills, understand load dynamics and safety zones, practice emergency procedures and machine maintenance, practice typical work processes.
   Training tips: first use motion-based XR simulators with flat-screen solutions, then transfer the knowledge to 100% VR in a realistic cockpit equipped with a replica control panel (e.g. cranes, excavators, wheel loaders, tractors, harvesters and forestry forwarders); preferably provide interactive video briefings or virtual walkarounds before each scenario; preferably enable task preview in observer mode

before the practical exercise and test; track progress using indicators of economy, quality and safety.

7. **Lab Assistant**
   Key strengths: rule adherence, detail orientation, comfort with repetitive, structured work.
   Simulation goals: learn laboratory safety and protocols such as pipetting and sample handling, develop familiarity with chemical safety and labelling, practice precise data recording.
   Training tips: use desktop chemistry first and preferably then transfer the knowledge into 100% VR by chemistry lab simulators (e.g., Mimbus Chemistry); offer both tutorial and sandbox modes; include built-in standard operating procedures (SOPs); use task completion badges for motivation.

8. **Auto Mechatronics**
   Key strengths: interest in mechanical systems, strength in understanding functional patterns.
   Simulation goals: practice various automotive maintenance processes, practice tool use and repair procedures, understand parts ordering and documentation, identify and diagnose engine/system issues.
   Training tips: use the Mimbus Discover automotive app first to introduce the profession, then use more advanced XR scenarios, e.g. 3D engine faults and breakdown; include step-by-step repair simulations; link actions to cause-and-effect diagnostics; add optional collaboration tools, such as pairing repairs or chat messages.

9. **Production Line Control & Maintenance**
   Key strengths: comfort with systemized workflows, repetitive precision work.
   Simulation goals: monitor machine performance and troubleshooting, understand industrial control panels and digital interfaces, practice scheduled maintenance protocols, review and practice series production quality control tasks and intervention protocols.
   Training tips: use a career guidance and profession demonstration simulation first, e.g. Mimbus Discover PLC app, then use various immersive XR simulations that replicate real-time factory control rooms; provide clear alarms and fault simulations; use color-coded instructions for troubleshooting; track attention to alarms, timings, and task logs.

Conclusion

This report has demonstrated the transformative potential of simulation-based vocational education and training (VET) for autistic individuals when it is carefully designed, individualized, and paired with real-world application. The integration of structured simulations into vocational pathways allows learners to build confidence, acquire technical and social skills, and prepare for employment in a supportive, low-pressure environment.

Through personalization, sensory accommodations, clear instructions, and immediate feedback, autistic trainees can engage with complex tasks in a manner that respects their unique cognitive and emotional profiles.

Importantly, simulation is not an isolated tool but part of a broader learner-centric design that includes initial assessment, onboarding, skill development, progress monitoring, and supported real-world transition. The involvement of educators, job coaches, therapists, and families is essential to ensure that learning is reinforced beyond the simulator and transferred into meaningful employment contexts. Structured simulation methods across professions—such as welding, logistics, car painting, and lab work—highlight how training can be adapted to individual strengths and sensory needs. Furthermore, tools like 360° video and simulated interviews help screen for environmental fit and prepare learners for realistic workplace interactions.

By implementing these approaches, training institutions can foster both competence and autonomy in neurodivergent individuals. Ultimately, this model not only prepares autistic learners for sustainable employment but also promotes equity, inclusion, and innovation within vocational education systems. The practices outlined here offer a replicable and scalable foundation for developing inclusive training programs that support the success of all learners.

Sources

Elmaghraby, A., & Elzain, A. (2022). *The effect of virtual laboratory simulations on medical laboratory techniques students' knowledge and vocational laboratory education*. Academia.edu. Retrieved April 2, 2025, from https://www.academia.edu/106436499/The_effect_of_virtual_laboratory_simulations_on_medical_laboratory_techniques_students_knowledge_and_vocational_laboratory_education

Matson, J. L. (Ed.). (2023). *Handbook of Applied Behaviour Analysis for Children with Autism: Clinical Guide to Assessment and Treatment*. Springer. https://doi.org/10.1007/978-3-031-27587-6

Wynkoop, D. R., Van Horn, M. L., Goff, R. M., & Riffel, L. A. (2019). *A systematic review of video modeling interventions to improve the independent living skills of students with autism spectrum disorder and intellectual disability.* **Beyond Behaviour**, 28(3), 145–153. https://files.eric.ed.gov/fulltext/EJ1254478.pdf

Crozier, S. M., & Tincani, D. A. (2015). *A systematic review and evaluation of video modeling, role-play, and computer-based instruction to teach social skills for children and adolescents with autism spectrum disorder.* **Review Journal of Autism and Developmental Disorders**, 2(3), 184–198. https://doi.org/10.1007/s40489-015-0065-6

Here are several reliable sources detailing the use of simulators for individuals with autism:

1. **Virtual Reality Simulations for Real-World Task Training**: A study by the University of Missouri developed a virtual reality simulation replicating a university's campus and shuttle system. This simulation aimed to help young autistic adults navigate public transportation, enhancing their real-world task completion skills. EurekAlert!+2cehd.missouri.edu+2Show Me Mizzou+2
2. **Multimodal Job Interview Training Platform (CIRVR)**: Researchers at Vanderbilt University designed CIRVR, a platform that simulates job interviews through spoken interactions. It collects data on eye gaze, facial expressions, and physiological responses to assess stress and affective states in autistic individuals. A feasibility study with 23 autistic participants demonstrated its potential effectiveness. Vanderbilt University
3. **Immersive Virtual Reality-Based Training Meta-Analysis**: A meta-analysis published in *Research in Autism Spectrum Disorders* evaluated the impact of immersive virtual reality (VR) on cognitive, social, and emotional skills of children with Autism Spectrum Disorder (ASD). The findings suggest that VR interventions can offer new possibilities for identifying and treating ASD. ScienceDirect+1ScienceDirect+1
4. **Vocational Training with Immersive Virtual Reality (VR4VR)**: The VR4VR system uses immersive virtual environments to assess and train individuals with ASD in vocational skills. Testing sessions with both neurotypical individuals and those with ASD provided insights into better design principles for such interventions. wevr.adalsimeone.me
5. **Designing Virtual Reality Tools for Students with ASD**: A systematic review in *Education and Information Technologies* examined the inclusion of third-person perspectives in CAVE-like immersive 3D virtual reality role-playing games. These tools aim to train social reciprocity in children with ASD. SpringerLink
6. **Virtual Reality in Autism: State of the Art**: An article in *Epidemiology and Psychiatric Sciences* discusses how virtual reality, by simulating real-world scenarios, provides safe, repeatable, and diversifiable environments for learning, which can be particularly beneficial for individuals with autism. Cambridge University Press & Assessment
7. **Video Modeling Plus Feedback for Vocational Social Skills**: A study in the *Journal of Behavioural Education* explored the effects of video modeling combined with feedback to teach workplace social skills in a simulated environment. Three transition-aged youth with autism participated, indicating the potential of this approach. SpringerLink+1SpringerLink+1
8. **Virtual Reality for Safety Skills Training**: A review highlighted the use of virtual reality technology to simulate real-life environments, demonstrating distinct advantages in safety skills interventions for individuals with autism. ResearchGate
9. **Teaching Vocational and Social Skills Using Video Modeling**: Research evaluated the effectiveness of video modeling to teach adolescents with autism spectrum disorder vocational and social skills in a simulated job setting, showing promising results. SpringerLink+2SpringerLink+2ScienceDirect+2

10. **Learning Experience Design in VR-Based Training**: A study explored the design and development of verbal prompts in virtual reality-based social skills training for autistic children, emphasizing the importance of tailored learning experiences. journal.alt.ac.uk

Other sources

DeBar, R. M., Kane, C. L., & Amador, J. L. (2022).
Video modeling instruction for individuals with autism spectrum disorder. In D. R. Shaffer & M. G. Nystrom (Eds.),
Teaching individuals with developmental delays (pp. 253–278). Springer.
https://doi.org/10.1007/978-3-030-96478-8_13

Pickard, K. E., Kilgore, B. R., & Warren, Z. (2016).
Video modeling and children with autism spectrum disorder: A survey of caregiver perspectives.
Journal of Early Intervention, 38(4), 273–290.
https://www.jstor.org/stable/44684073

Meadan, K., Ostrosky, J. A., Triplett, B., Michna, A., & Fettig, A. (2011).
Video modeling and children with autism spectrum disorder: A systematic review of modeling interventions.
Journal of Special Education Technology, 26(2), 25–36.
https://doi.org/10.1177/016264341102600202

Wahoski, J. (2015).
Video modeling: An intervention for autism.
Teaching Exceptional Children Plus, 11(3), Article 3.
https://files.eric.ed.gov/fulltext/EJ1230688.pdf

Krata, J. (2011, April).
Using video modeling as an evidence-based intervention for ASDs.
Autism Spectrum News, 3(4).
https://autismspectrumnews.org/using-video-modeling-as-an-evidence-based-intervention-for-asds/