Applying the **Neurodivergent Scale for Interacting with Robots (NSIR)** to the **Apprenticeship Model** (Cakmakci et al., 2025; DelPreto et al., 2020) enables a "neuro-inclusive" approach to robot learning and human-robot collaboration.

In this model, a human "master" provides demonstrations to a robot "apprentice" through teleoperation or virtual reality (VR) when the robot encounters a task it cannot complete autonomously. The NSIR ensures that this master-apprentice relationship is built on cognitive and social alignment specifically for neurodivergent individuals.

## 1. Evaluating the "Master" Experience

The apprenticeship model relies on the human's ability to provide high-quality demonstrations and evaluate the robot's skill.

- **Cognitive Sharing:** Use **NSIR Item 3** (*"I think I can share my thinking with the robot without speaking"*) to assess the effectiveness of the communication channel. If a neurodivergent master feels they can communicate "thinking" non-verbally through the VR interface, the apprenticeship is more efficient.
- **Social Monitoring:** Apply **NSIR Item 2** (*"Sometimes I stare at the robot"*) to determine if the human master is over-monitoring the apprentice due to lack of trust or sensory engagement. In a "neuro-inclusive" apprenticeship, staring might be a tool for detailed error-analysis rather than a sign of anxiety.

## 2. Trust and Predictability in the Apprentice

The Cakmakci model emphasizes that a robot's proactive troubleshooting and "transparency" (communicating internal state) are preferred by users.

- **Consistency as Trust: NSIR Item 8** (*"I believe that my robot is the same with me as it is with anyone"*) is a critical metric for neurodivergent masters. If the robot apprentice is perceived as mechanically consistent, it reduces the "social workload" on the human, allowing them to focus purely on the technical task of teaching.
- **Shared Identity (Kinship):** The **NSIR Factor: Anthropomorphic Connection** (e.g., **Item 1**: *"The robot is more like me than anyone else I know"*) can be used to measure the "bonding" between master and apprentice. A higher kinship score may lead to more patient teaching and a more successful "learning by demonstration" pipeline.

## 3. Application to "Cognitive Apprenticeship"

If the model is applied as a **Cognitive Apprenticeship** (where a robot teaches a human), the NSIR serves as a progress and safety monitor.

- **Scaffolding and Fading:** As a robot "coach" fades its support, use **NSIR Factor: Social Comfort/Trust Safety** to ensure the neurodivergent learner still feels psychologically safe to fail and reflect.

- **Radical Privacy in Learning:** Use **NSIR Item 7** (*"I feel comfortable undressing in front of my robot"*) to explore the use of robot apprentices in intimate or home-based vocational training, where a human "master" might be too socially intimidating.

## Summary of Integration

| Apprenticeship Component | NSIR Application Item | Research/Practice Goal |
|---|---|---|
| **Modeling/Demonstration** | **Item 3:** Non-verbal thinking. | Evaluate if teleoperation/VR captures "master" intent. |
| **Coaching/Feedback** | **Item 5:** Feeling recognition. | Determine if the robot understands the "master's" frustration. |
| **Reflection** | **Item 2:** Staring/Monitoring. | Measure the depth of the user's analytical engagement. |
| **Exploration/Autonomy** | **Item 8:** Predictability. | Ensure the robot's independent actions don't cause stress. |

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By applying the NSIR, the **Apprenticeship Model** moves beyond technical grasping success rates and begins to measure the **socio-cognitive success** of the collaboration for neurodivergent populations.