NAST Conference Breakaway Session Feedback Template

**Theme: Innovating Technical Education for a Changing World**

**TECHNICAL sCIENCES**

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Session Topic (Extension):

Reimagining practical assessment in Technical Sciences : Integration and Blending innovation, simulation and real world application

## 1. Aligning Curriculum with Industry Needs

How can technical education align the curriculum with industry's needs?
Please provide practical strategies and planning for improved relevance and responsiveness.

Group Insights & Recommendations:

**1.1. Industry Collaboration and Partnerships**

**Strategy:**

* **Establish partnerships** with local industries, manufacturing companies, mines, power stations, and technology firms.

**Planning:**

* Create an **Industry Advisory Committee** involving educators, curriculum developers, and industry experts to meet at least **twice a year**.
* Arrange **regular school-industry forums**, job-shadowing programs, or industry visits.
* Identify the **top technical skills needed** and update curriculum outcomes accordingly.

**📚 1.2. Curriculum Review and Integration**

**Strategy:**

* Review curriculum **every 3–5 years** to include emerging technologies and workplace practices.

**Planning:**

* Align **core topics** (e.g., electricity, mechanics, thermodynamics) with tools, software, and processes used in industry.
* Integrate **project-based assessments** where learners solve real-world technical problems.

**Example:**

* Use real-life case studies from industries (e.g., load-shedding challenges in SA) to teach energy systems.

**🧰1.3. Practical and Hands-On Learning**

**Strategy:**

* Increase **practical work, simulations, and lab activities** to develop technical skills.

**Planning:**

* Partner with SETAs, TVET colleges, or companies to supply **equipment, tools, and training kits**.
* Use **virtual labs** or **low-cost models** where resources are limited.

**Example:**

* Construct simple hydraulic systems or circuit boards during lessons to mimic industry processes.

**🧑‍🏫1.4. Teacher Training and Upskilling**

**Strategy:**

* Continually upskill teachers with **latest technical skills**, tools, and teaching methods.

**Planning:**

* Organize **annual CPD workshops** in collaboration with universities or industry experts.
* Offer **teacher externships**—short placements in industry to observe and learn.

**🏫 1.5. Work-Integrated Learning (WIL) for Learners**

**Strategy:**

* Provide learners with exposure to real work environments.

**Planning:**

* Coordinate **structured internships**, learnerships, or holiday programmes in partnership with local industries.
* Include **portfolio development** that tracks learners' experiences and skills.

**📈1.6. Local Context and Economic Trends**

**Strategy:**

* Customize curriculum content to **fit regional economic activities** (e.g., agriculture tech in rural areas, mining in Limpopo).

**Planning:**

* Consult **local employers** to understand their workforce needs.
* Incorporate **locally relevant projects**, like water purification or renewable energy setups in rural areas.

**🧮1.7. Soft Skills and Entrepreneurial Training**

**Strategy:**

* Equip learners with communication, problem-solving, and entrepreneurial skills.

**Planning:**

* Embed **cross-disciplinary activities** such as presenting a technical design to a mock panel (like a pitch).
* Include modules on **basic business skills**, budgeting, and innovation.

## 2. Addressing Teacher Shortages in Specialized Technical Subjects

Specific ideas and suggestions to address teacher shortages in specialized technical subjects.
Consider recruitment, training, and retention strategies based on current realities.

Group Insights & Challenges Identified

1. **Low supply of qualified teachers** in subjects like Technical Sciences, Mechanical Technology, and Electrical Technology.
2. **Limited exposure and training** in technical subjects during teacher education.
3. **Urban-rural disparity**, with rural schools most affected by shortages.
4. **High teacher turnover** due to stress, isolation, or lack of support.
5. **Attractive opportunities in private sector** often lure technically skilled individuals away from teaching.

**🧲 A. Recruitment Strategies**

**Insight:** Many STEM-qualified individuals don’t consider teaching due to perceived low prestige or pay.

**Recommendations:**

1. **Targeted bursaries and incentives**:
	* Expand **Funza Lushaka bursaries** to prioritize technical subjects.
	* Offer **sign-on bonuses** or relocation allowances for scarce-skill areas.
2. **Recruit from related fields**:
	* Allow **artisans, engineers, and technologists** to transition into teaching via **bridging or PGCE programs**.
	* Promote **Teach the Nation**-style programs targeting final-year science/engineering students.
3. **University-school partnerships**:
	* Partner with universities to **sponsor final-year student placements** at technical schools.

**🎓 B. Teacher Training & Development**

**Insight:** Many teachers are either under-qualified or not confident in delivering specialized technical content.

**Recommendations:**

1. **Short-term training (skills top-ups)**:
	* Offer **modular courses or micro-credentials** in mechanics, electronics, and curriculum content.
2. **Long-term professional development**:
	* Launch **Technical Teacher Academies** (in collaboration with TVET colleges or SETAs).
	* Create a **mentorship program** pairing experienced teachers with new recruits.
3. **Online & hybrid delivery**:
	* Develop **online CPD courses** for Technical Sciences through platforms like **Thutong** or **Umalusi** portals.

**📈 C. Retention and Motivation**

**Insight:** Teachers often leave due to burnout, poor support, or limited career growth.

**Recommendations:**

1. **Career progression pathways**:
	* Introduce roles like **Lead Technical Teacher**, subject advisors, or curriculum developers for upward mobility.
2. **Supportive school environments**:
	* Provide **technical assistants** or lab support staff to reduce teaching overload.
	* Equip schools with proper **workshops and resources** to ease teaching pressures.
3. **Recognition and rewards**:
	* Implement **awards for excellence** in technical teaching at provincial and national levels.
	* Offer **sabbatical/study leave** options for continued learning.

**🧭 D. Policy and Systems Support**

**Insight:** System-wide change is needed for sustainable impact.

**Recommendations:**

1. **National tracking of technical subject needs**:
	* Create a **data dashboard** to monitor teacher supply/demand by province and subject.
2. **Flexible qualification pathways**:
	* Advocate for **Recognition of Prior Learning (RPL)** for industry experts entering teaching.
3. **Collaboration with SETAs**:
	* Fund and support **teacher development programs** under scarce skills development initiatives.

## 3. Enhancing School-Industry Partnerships

How can technical schools participate in and benefit from school-industry partnerships?
Include workplace exposure opportunities for learners.

Group Insights & Recommendations:

🎯 Purpose of School-Industry Partnerships in Technical Education

* + Bridge the gap between classroom theory and real-world application.
	+ Equip learners with practical, employable skills aligned with workplace demands.
	+ Build a pipeline of future artisans, technicians, and engineers for industry.

🔧 **How Technical Schools Can Participate**

**🏭 1. Establish Formal Industry Partnerships**

**Action:**

* + Sign MOUs (Memorandums of Understanding) with local, national and international businesses, TVET colleges, municipalities, and engineering firms.

**Benefit:**

* + Long-term commitment to support learner development, teacher upskilling, and resource sharing.

**🤝 2. Form Industry Advisory Committees**

**Action:**

* + Invite representatives from local industries to serve as advisors on curriculum relevance, trends, and technologies.

**Benefit:**

* + Keeps teaching aligned with current industry standards and expectations.

**🛠️ 3. Coordinate Workplace Exposure for Learners**

**Opportunities Include:**

* + Job shadowing (1–2 days): Learners observe daily work in technical fields.
	+ Internships/holiday placements (1–4 weeks): Learners gain hands-on experience.
	+ Site visits: Tours of factories, workshops, and energy plants to visualize theory in practice.

**Planning Tips:**

* + Align with school calendar breaks and Grade 11/12 project requirements.
	+ Ensure parental consent and transport arrangements are in place.
	+ Provide learners with reflection sheets or activity logs.

**🧰 4. Invite Industry Experts to Schools**

**Action:**

* + Host regular career talks, demonstrations, or guest lectures from artisans, technicians, or engineers.

**Benefit**:

* + Inspires learners and exposes them to real career pathways in the technical field.

**🧑‍🏫 5. Teacher Externships and Upskilling**

**Action:**

* + Place teachers in short-term industry-based learning (e.g., 1 week during holidays).

**Benefit:**

* + Teachers return with updated skills and current practices to enrich classroom instruction.

**🧱 6. Leverage Industry Support for Resources**

**Action:**

* + Approach companies for donations of equipment, tools, or consumables.
	+ Ask partners to help sponsor practical projects or competitions.

**Benefit:**

* + Improves access to quality learning materials, especially in under-resourced schools.

**📈 7. Joint Projects and Challenges**

**Action:**

* + Co-design real-world technical challenges (e.g., build a water filtration model or simple solar-powered device).
	+ Let learners present solutions to a panel of industry judges.

**Benefit:**

* + Boosts critical thinking, creativity, and problem-solving in real contexts.

## 4. Gaining Recognition as Special-Focus Schools

How can technical schools gain greater recognition as special-focus schools?
Explore branding, policy, and community engagement approaches.

Group Insights & Recommendations:

**4.1. Branding and Visibility**

**Goal:** Establish a strong identity as a technical education leader.

**✅ Strategies:**

* **Create a unique brand identity**: Name, logo, and slogan that reflect the school’s technical vision (e.g., *“Future Innovators Technical School”*).
* **Highlight success stories**:
	+ Publish **learner achievements**, innovations, and alumni employed in technical careers.
	+ Share on **social media, newsletters, and local media**.
* **Host public events**:
	+ Organize **open days, technical fairs, competitions, and exhibitions** showcasing learner projects.
	+ Invite media, community, and businesses to attend.
* **Professional school website**:
	+ Include information about technical programmes, partnerships, learner outcomes, and enrolment procedures.

**🏛️4 2. Policy Engagement and Recognition**

**Goal:** Secure formal recognition from the Department of Basic Education (DBE) and stakeholders.

**✅ Strategies:**

* **Apply for “Specialised Focus School” status** through DBE or the Provincial Education Department (PED).
	+ Prepare a **portfolio of evidence**: learner enrolment trends, partnerships, infrastructure, and technical results.
	+ Align with policies like the **Three-Stream Model** (academic, technical, vocational).
* **Engage policy-makers**:
	+ Invite **district officials, subject advisors, and curriculum planners** to witness school programs in action.
	+ Attend **education forums and summits** where technical education is discussed.
* **Benchmark with other focus schools**:
	+ Learn from schools recognized for ICT, Maritime, Agriculture, or Engineering specialisation.

**🤝4.3. Community and Stakeholder Engagement**

**Goal:** Build support and recognition from parents, industries, and the local community.

**✅ Strategies:**

* **Parent & community involvement**:
	+ Host quarterly meetings where parents learn about technical career paths and how to support learners.
	+ Invite community artisans or small business owners to contribute to skills development initiatives.
* **Alumni network development**:
	+ Track successful alumni and involve them in mentorship or career talks.
	+ Create a visible **“Wall of Achievement”** at the school.
* **NGO and SETA partnerships**:
	+ Engage **Sector Education and Training Authorities (SETAs)** and non-profits in funding, workshops, and skills development.
* **Outreach to primary schools**:
	+ Conduct career-awareness visits and STEM-based activities to build interest among future learners.

**🔍 Case in Practice: Branding Example**

**School Name:** *TechRise Secondary School*
**Slogan:** *“Empowering Innovation, Building Futures”*
**Branding Tools:**

* Learner-designed uniforms with logo
* YouTube channel with “Tech Thursdays” showing experiments
* Branded reports, banners, and flyers during expos

## 5. Integrating eLearning in Practical Subjects

Will the integration of eLearning platforms in practical subjects be effective?
How can we prepare for this future-oriented shift? Identify tools, training needs, and implementation steps.

Group Insights & Recommendations:

**Integrating eLearning in Practical Subjects**—such as **Technical Sciences**—can be highly effective **if implemented strategically**, despite the hands-on nature of these subjects. eLearning is not a replacement for practical work, but rather an **enhancement tool** that supports learning through simulations, video demonstrations, virtual labs, and interactive assessments.

**✅ Will it be Effective?**

**✔️ Yes, if done right.**

**eLearning can**:

* Reinforce theory through **interactive visuals** and animations.
* Allow **self-paced revision** of complex concepts (e.g., circuit theory, mechanical systems).
* Bridge the gap in **under-resourced schools** by offering **virtual alternatives** to real lab equipment.
* Enable **hybrid learning** (a mix of classroom and online work), useful for load shedding or absenteeism.

**🧰 5.1. Recommended Tools & Platforms**

**📱 5.1.1 Hardware & Connectivity**

* Smartboards / tablets / computers (for teachers and learners)
* Projectors with internet access
* Offline access tools like **RACHEL server** or **offline Moodle**

**💻 5.1.2 Platforms**

| **Tool** | **Purpose** |
| --- | --- |
| **Khan Academy / YouTube EDU** | Video tutorials for physics and tech concepts |
| **PhET Simulations** | Interactive simulations (electricity, forces, waves) |
| **Moodle or Google Classroom** | Learning management system (assignments, feedback) |
| **Tinkercad / AutoCAD / Arduino Simulators** | Virtual electronics and engineering design |
| **ExploreLearning Gizmos** | Simulations for practical STEM subjects |
| **Siyavula** | South African-aligned practice for Science & Maths |

**🧑‍🏫 2. Training Needs**

**🎓 2.1 For Teachers:**

* **Digital literacy training**: how to use learning management systems and simulations.
* **Blended teaching skills**: designing lessons that combine theory, practice, and tech tools.
* **Content creation**: recording lessons, using screen-sharing, and editing short instructional videos.

**🎓 2.2 For Learners:**

* Orientation on **navigating platforms**, submitting assignments, and engaging with simulations.
* Guidance on **digital responsibility and online learning discipline**.

**Support Needed:**

* DBE/Provincial support for **teacher development programs** focused on eLearning.
* Partnerships with **TVETs, universities, or NGOs** for technical and pedagogical training.

**🧭 3. Implementation Steps**

**🧱 3.1 Step-by-Step Plan**

| **Phase** | **Key Actions** |
| --- | --- |
| **1. Planning** | Audit existing digital infrastructure & internet access |
| **2. Pilot** | Select one or two subjects or grades to test the eLearning model |
| **3. Training** | Run workshops for teachers and learners on selected tools |
| **4. Integration** | Introduce eLearning in lesson plans and assessments |
| **5. Monitor & Support** | Gather feedback, resolve challenges, and adjust |
| **6. Scale-Up** | Extend to more subjects, grades, and schools |

**📌 Tips for Successful Integration**

* Blend eLearning with **physical hands-on tasks** (e.g., virtual circuit first, then build it).
* Use eLearning for **pre-lab instruction**, quizzes, and **post-lab reflection**.
* In under-resourced areas, prioritize **offline content** and **shared devices**.
* Appoint a **Digital Champion Teacher** at each school to assist peers.

**🚀 Conclusion: A Future-Oriented Shift**

The integration of eLearning in practical subjects is **not only effective but essential** for preparing learners for the **Fourth Industrial Revolution (4IR)**. With proper tools, teacher training, and phased implementation, schools can:

* Improve access to quality resources
* Enhance conceptual understanding
* Reduce pressure on limited physical equipment

## Summary of Group Feedback

Top 3 Recommendations:
1. Curriculum integration throughout the grades.
2. School-Industry collaboration
3. Coordinate corporate exposure for learners and parents

Challenges Identified:
- Vocational schools seen as academic schools
- Lack of practical apparatus and consumables
- Curriculum does not address the needs of the industry.

Proposals Worth Scaling or Piloting:
- School-industry collaboration
- Curriculum designs that feeds the market needs.