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Improving Skills Acquisition in Vocational Education Through Criterion-Referenced Assessment Practice

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Abstract
Vocational education is designed to equip individuals with practical skills necessary for careers or trades in specific areas of specialisation. As the technological world increasingly emphasizes self-reliance among vocational education graduates, individuals are expected to be economically self-sufficient without depending on the government. In this context, acquiring the skills and potential for success in life is essential. This paper advocates for the vital role of Criterion-Referenced Assessment (CRA), which evaluates student performance against predetermined standards. By implementing a criterion-referenced assessment tool, graduates can enhance skills and competencies crucial for employment in the labour market. Through criterion-referenced assessment, evaluators can improve their assessment practices, provide targeted feedback, and empower students to achieve proficiency and excellence in their chosen careers. Moreover, adopting CRA in vocational institutions goes beyond merely improving skills; it promotes authentic assessment practices that deepen understanding of essential skill acquisition, utilizing tools such as performance assessments, direct observations, checklists, rating scales, assessment rubrics, and portfolios aligned with CRA. This type of assessment creates a comprehensive evaluation framework that emphasizes practical demonstrations, ensuring students master the skills needed to succeed in their vocational careers.
Keywords: Criterion-referenced assessment, competencies, predetermined standard, skills acquisition, vocational education.
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1. Introduction

In early civilizations, the first form of technology education likely concentrated on vocational training, aiming to develop students' skills and expertise using technological tools to meet specific objectives. According to Nneji et al. (2013), as cited in Faremi et al. (2017), technology refers to accessible knowledge, skills, and processes used to create, utilize, or perform tasks consistently and repeatedly. Today, technology fuels job creation, helping everyone find meaningful work and establish a professional identity. The United Nations Educational, Scientific, and Cultural Organization [UNESCO] (2021) highlighted a major challenge in Africa: the mismatch between vocational training programs and employer demands. This problem is especially severe in areas where the informal economy is widespread and the labour market is highly volatile. The gap between existing skills and economic needs may result from trainers and assessors being unable to accurately identify the skills employers require, often because of the use of unsuitable assessment methods.

In most countries today, the term Vocational and Technical Education has been replaced with Technical and Vocational Education and Training (TVET). The primary goal of vocational education is to ensure that students of pre-vocational, senior secondary, and tertiary institutions acquire the necessary skills and competencies in their area of specialization, thereby providing them with job opportunities after graduation. Some of the vocational institutions deviated from this. They failed to achieve the primary goal of vocational education due to the norm-referenced assessment measures (NRA) that were implemented, which primarily help compare students' performance with that of their age group or grade level, rather than emphasizing individual achievement of specific standards through criterion-referenced assessment (CRA). Not all students are good at verbal tests and can express themselves the way the assessors want in NRA. However, opportunities should be provided for each student to display their potential and understand their strengths and areas for improvement. The world is moving towards self-reliance, where individuals can stand independently instead of relying on the government to earn a living. In this era where many nations emphasise skill acquisition for youth to achieve self-employment, arguably, the paramount concern in today's world is not how well an individual performs compared to their norm-referenced group, but rather, how effectively they adapt their intelligence to sustain and improve the world (Sternberg et al., 2022).

The quality of vocational education and training (VET) can be enhanced by implementing graded assessments.

This shift in focus from compliance to excellence aims to boost confidence in the system, ultimately leading to better outcomes for both students and industry (Department of Education, Skills and Employment, 2020, as cited in Skiba, 2020). The traditional approach to assessing and evaluating students' competencies in vocational education needs to be re-examined in today's context, where it is essential to recognise and measure each student's unique potential and skills.

According to Hambleton et al. (1978), as cited in Sternberg et al. (2022), criterion-referenced assessments serve many purposes in education and beyond. They help professionals to monitor individual progress in goal-based programs, identify learning gaps, evaluate educational and social initiatives, and measure skills for certification and licensing exams. The use of CRA to assess students' potential in a specific area of specialization is not limited to vocational education; it can also be applied in other fields where instructors want to measure academic skills based on external and internal standards. According to Sternberg et al. (2022), criterion-referenced achievement tests are typically designed around an external benchmark that is independent of the tested population, such as a student's grade level in subjects like spelling, vocabulary, or arithmetic. The process of selecting test items for these standards can vary, including methods such as choosing from a broad range of relevant knowledge, focusing on the most important knowledge in a subject, selecting representative knowledge from a field, or randomly sampling knowledge within that area.

Regarding internal standards, criterion-referenced assessments can be based on a particular theory's framework. Even when no clear theory is explicitly stated, people often unconsciously rely on an implicit one. These internal assessments can be designed in various ways, such as aligning with a grade level, vocabulary level, or another external knowledge base to gauge crystallized intelligence. For example, test performance may be linked to aspects of intelligence theories, such as storage capacity or central executive processing required for a test item (Primi, 2014; Carroll, 1993; Cattell, 1971, as cited in Sternberg et al., 2022).

The primary method of criterion-referenced assessment in intelligence research has been the concept of mental age (MA), which sets expectations for an individual's mental performance based on their chronological age. However, mental age is now widely recognized as a measure (Sternberg 2020 as cited in Sternberg et al., 2022). In a study conducted by Faremi et al. (2017) on the mental ability of junior secondary school students using a basic technology multiple-choice objective test in Nigeria, the study found that the performance of students aged 12-13 and 14-15 years in basic technology multiple-choice formats is slightly higher than that of students over 15 years old, indicating that younger students learn faster than their older counterparts in basic technology multiple-choice tests in which the comparison focus on the norm-referenced assessment method.

To successfully implement a technical and vocational education curriculum, instructors need structured support to use criterion-referenced assessment effectively. This ensures the new curriculum and the best teaching strategies are delivered in the classroom. Two essential elements for success are:

- A clear understanding of the subject's conceptual framework.
- Organized support, such as learning the theory, observing high-quality demonstrations, practicing, and receiving coaching and feedback on the most effective teaching strategies (Bandele & Faremi, 2012). These can be best achieved through criterion-referenced assessment techniques.

2. Vocational education

Vocational and technical education is the type of education that is designed to offer individuals the potential for improving themselves in their general proficiency, especially in their areas of specialization in relation to their present or future occupation (Okoye & Arimonu, 2016). Vocational education primarily focuses on developing practical skills to prepare individuals with the knowledge and training necessary for specific careers or trades in fields such as plumbing, electrical work, construction, woodworking, welding, graphic design, and fashion design. It is a part of education that offers students or trainees a pathway to gain the potential, skills, and knowledge required for a particular occupation (Deléchat, 2024). Vocational education encompasses specialized programs that equip individuals with the essential skills and training necessary for a specific profession or career path (Jens-Henning, 2024).

U. S. Congress, Office of Technology Assessment. (1994) emphasised four types of skills to be evaluated in vocational education programs in order to achieve their various goals. There are:

- *Academic skills*: These focus on core areas, including reading, writing, and mathematics.

- *Vocational skills:* These are specific to particular jobs or roles.
- *Generic workplace skills:* These include traits like a positive work attitude, teamwork, effective communication, and other essential competencies needed in the workplace.
- *Broad technical skills:* These include the essential knowledge and abilities related to technology, information, and organization needed to succeed in an industry or across various occupations.

The way each country organizes its vocational education and the subjects offered to students varies slightly. In the United States, vocational education equips students with the technical skills and knowledge needed for specific careers, such as pharmacy technician, carpentry, culinary arts, and medical assisting, among others. Vocational schools for international students combine classroom instruction with hands-on training, ensuring a broad understanding of both theory and practical skills. This prepares students to confidently perform their duties in their chosen profession (Taher, 2024). In Australia, VET courses cover a wide range of fields, including information technology (IT), cybersecurity, and computing; travel, tourism, and hospitality; business, accounting, management, and entrepreneurship; engineering, automation, and technology; and agriculture, among others (Australian Government, n.d). In Europe, countries like Germany require students to fulfill management functions in the workplace. They participate in advanced vocational programs offered as part-time or full-time courses in agriculture, design technology, business, and social care. These combine school-based learning with apprenticeships, offering subjects such as mechatronics, retail, and hospitality, which are recognized as strong dual education systems (European Centre for the Development of Vocational Training, 2020).

In Africa, countries like South Africa primarily deliver Vocational and Technical Education through secondary schools and Technical and Vocational Education and Training (TVET) colleges, to provide practical skills for employment or entrepreneurship. Their secondary school education is organized through a three-stream model, which includes academic, technical vocational, and technical occupation tracks, allowing students to pursue vocational training. Regarding the three-stream model, 22 occupational subjects and 13 vocational subjects have been developed for skills schools and regular public schools starting from grades 8 and 9. Technical subjects such as civil engineering, mechanical engineering, electrical engineering, agricultural science, and consumer and hospitality studies are aligned with the National Senior Certificate (NSC) (Department of Basic Education, Republic of South Africa, 2023).

Similarly, in Nigeria, students are exposed to vocational education subjects from Junior Secondary School (JSS) and Senior Secondary School (SSS) levels, as well as in Technical Colleges, with specialized areas and practical components. The vocational curriculum emphasizes pre-vocational studies at JSS and specialized vocational tracks at SSS, including technical colleges and higher institutions. Vocational subjects like Home Economics, Agricultural Science, Business Studies, and Basic Technology are offered at the JSS level (Federal Ministry of Education, Nigeria, 2012). At the SSS level, subjects include bookkeeping, food and nutrition, technical drawing, agricultural science, auto mechanics, building construction, computer craft studies, clothing and textiles, metalwork, and woodwork (Nuffic, n.d.). In technical colleges, students specialize in areas such as motor vehicle mechanics, electrical/electronics, welding and fabrication, plumbing and pipefitting, carpentry and joinery, painting and decorating, catering craft practice, and garment making (Etim, 2016). These programs lead to a National Technical Certificate (NTC) or a National Business Certificate (NBC), with the curriculum overseen by the National Business and Technical Examinations Board (NABTEB).

Technical and Vocational Education and Training (TVET) in Eswatini aims to provide individuals with practical skills for employment, entrepreneurship, and socio-economic development. TVET is delivered through secondary schools, vocational institutions, and correctional facilities (Ngozwana, 2022). The Eswatini Ministry of Education and Training (MoET) is conducting a pilot study on TVET by selecting 16 senior secondary schools, of which four were selected from each region. Students in this program are required to take all core general subjects and prevocational core subjects (including IT and Entrepreneurship), while choosing one specialization in practical areas such as agriculture, business studies, home economics, or technical subjects. The program aims to equip learners with foundational skills to pursue post-secondary education, secure employment, or start a business. It is accredited by the Examination Council of Swaziland (ECOS) and the Directorate of Industrial Vocational Training (DIVT) (Ministry of Education and Training, Eswatini, 2021). In Eswatini, vocational institutions offer programs in engineering and technology, handcraft and design, ICT, agriculture, hospitality, and tourism (Ngozwana, 2022). At correctional facilities, training encompasses a range of skills,

including welding and metalwork, leather crafting, auto-electricity, carpentry, repair, and upholstery, among others (Ngozwana, 2022).

Proponents of Secondary Technical and Vocational Education (TVE) argue that it prepares students both technologically and mentally for direct employment, making them potentially more productive than their academically focused peers (Brunello & Giannini, 2004; Min & Tsang, 1990, as cited in Guo & Wang, 2020). The dual apprenticeship system is prevalent in European countries, including Germany, Switzerland, and Austria. This system combines school-based academic education with practical on-the-job training, while informal training or apprenticeships are more prevalent in low- and middle-income countries (Guo & Wang, 2020).

Many people perceive that students attending Technical and Vocational Education and Training (TVET) institutions do so only as a last resort after failing to gain admission to a university. This view was shared by respondents from Côte d'Ivoire, Ethiopia, Ghana, Niger, and Uganda in a survey conducted by the African Center for Economic Transformation [ACET] (2022). Although they acknowledge that the internal returns on TVET are high, parents and other stakeholders regard it as a fall back option for those who struggle in traditional academic settings. In Ghana, despite the government's efforts to promote TVET to equip the workforce with practical skills, the sector still grapples with a negative public perception as a choice primarily for academically weaker students (ACET, **2022)**.

In Uganda, 71% of stakeholders believe that the Business, Technical, and Vocational Education and Training (BTVET) curriculum, updated under the BTVET strategic plan 2011-2020, is well-prepared for the future and aligned with current and emerging job market needs. In Ethiopia, a common concern among respondents is that TVET and secondary education are poorly aligned with labour market demands. This misalignment is primarily attributed to a lack of engagement with employers in the curriculum development process, a view shared by approximately 65% of policymakers, regulators, students, and employers. In Côte d'Ivoire, 81% of employers reported that they are not involved in curriculum development, revisions, or reforms, despite a strong desire among many employers to participate in the process (ACET, 2022). In South Africa, several challenges face the Vocational Education and Training (VET) sector, including top-down governance and a lack of emphasis on workplace-based training opportunities, as reported in the 2021 innovation report on VET colleges (NACI, 2021, as cited in Prummer et al., 2024).

Prummer et al. (2024) reprted that the unemployment rate of 64.4% in South Africa remains high, and is not matched by a growing economy that can provide employment (Kraak, 2008; South Africa Statistics (SAS) 2021 as cited in Prummer et al. (2024). National Advisory Council on Innovation [NACI] (2021) as cited in Prummer et al. (2024) that the vocational education and training (VET) sector of South Africa should bear the responsibility to redefine postsecondary education that will play a role in advancing industrialisation and expanding the job market.

3. Assessment practice

Testing and assessment in secondary vocational education differ significantly from those in general education. The best practices in vocational education utilize alternative evaluation methods, although their quality varies widely. Like other educational programs, vocational education employs both written, short-answer tests and various performance assessments. However, it relies less on short-answer tests and more on performance-based assessments. Written tests in vocational education typically include multiple-choice or matching formats. Increasingly, these tests are administered using standardized tools developed by states or test vendors or locally adapted versions of those tools (U.S. Congress, Office of Technology Assessment, 1994).

Assessment for learning describes how teachers use assessment evidence to guide their teaching and help students achieve learning outcomes (Black & Wiliam, 2018). Different education systems emphasize various assessment types, aiming to strike a balance between formative and summative approaches. Assessment is most effective when integrated with teaching and learning, offering detailed insights into overall progress. A notable challenge is the resistance to using standardized tests for high-stakes assessments, especially in the US and other regions. These high-stakes tests are often blamed for practices like 'teaching to the test' and narrowing the curriculum. Such practices reduce assessment to multiple-choice questions, limiting in-depth understanding of what students know. This approach fails to assess individual potential and merely compares performance against standard criteria (Centre for Education Statistics and Evaluation [CESE], 2015).

In Australia, the national competency standards in the VET sector are typically defined by units of competency that serve as the standard benchmarks for assessing learners. The assessment techniques used in vocational education should undergo a standardized process for evaluating students' knowledge and competencies based on what they are expected to learn during their training. Assessment in this context also refers to the criteria, tasks, and techniques training providers employ to objectively assess and certify trainees or students as prepared for the workplace (Bray, 2025). Bray (2025) noted that the qualities of standard vocational assessment methods should include content validity, meaning the method used aligns with the specific context of the evaluation in terms of design, questions, and the ability of students or trainees to demonstrate their actual skills and knowledge of the subject taught. The assessment techniques used must be reliable and predictable. The method used must also be adaptable to meet the training requirements and preferences. When assessing vocational education students, the assessor needs to know precisely what they are looking for and what resources are needed to put into practice.

For vocational education students to excel, advance their studies, and successfully navigate their future careers, they must develop strong competencies, which can be achieved and interpreted through criterion-referenced assessment procedures. Effective vocational education is crucial for economic development, as it produces a skilled workforce essential for a country's economic growth and sustainability (Yusop et al., 2022). The assessment methods for vocational education have evolved over the years. Traditionally, assessments primarily focused on evaluating students' knowledge and competencies based on their training without much focus on using criterion-referenced assessment methods. Bray (2025) outlines several steps for evaluators or assessors to select the appropriate assessment methods in vocational education:

- The evaluator should consider the learning context to ensure that the assessment strategies allow students to demonstrate their knowledge and skills fully.
- The uniqueness of the assessment strategies should reflect students' diverse learning styles in training.
- The chosen method should facilitate the efficient collection of assessment evidence, considering the evaluation arrangements, such as location and duration.

All these factors should be considered when using criterion-reference assessment to enhance the acquisition of knowledge, skills, and competencies in various trades within vocational education.

4. Criterion-referenced assessment

Norm-referenced and criterion-referenced assessments are commonly used to interpret students' performance. The norm-referenced assessment aims to compare students' performance to their peers by ranking them relative to others, which is not suitable for evaluating performance based on predefined criteria (Burton, 2006). A criterion-referenced assessment process is a competency-based evaluation where individuals are assessed against established criteria or predetermined benchmarks, such as those outlined in units of competency or accredited modules. Criterion-referenced assessment (CRA) is a form of evaluation that involves grading students with pre-specified qualities or criteria (Brown, 1998; Harvey, 2004, as cited in Curriculum and Academic Development, 2022). Norm-referenced assessment evaluates individuals based on their performance compared to others taking the same test. Examples of intelligence scales used for this purpose in norm-referenced assessment include the current versions of the Stanford-Binet Intelligence Scales (5th ed.—Roid, 2003) and the Wechsler Intelligence Scale for Children (5th ed.—Wechsler, 2014), which are used to assess students (Sterberg et al., 2022).

Criterion-referenced assessment (CRA) and norm-referenced assessment (NRA) scoring serve different purposes when applied in these contexts. It is essential to link students' performance with specific elements of a theory of intelligence, such as requirements for memory storage or central-executive processing, as outlined in the theory being used (Primi, 2014, as cited in Sternberg et al., 2022). The interpretation of assessment scores distinguishes criterion-referenced from norm-referenced approaches. Criterion-referenced interpretations provide various applications for educational and other contexts. They enable instructors to track individual progress in objectives-based instructional programs, diagnose learning deficiencies, evaluate educational and social action programs, and assess the competencies of students or trainees in certification and licensing examinations (Hambleton et al., 1978, as cited in Sternberg et al., 2022).

According to Green (2002), criterion-referenced assessment, based on descriptions of performance levels, can be used to provide feedback that helps vocational learners identify their strengths and improve in areas where they excel or require development. It also helps guide future teaching and learning needs in vocational education,

building the necessary skills. CRA should be standards based, where students are assessed on their ability to achieve predetermined learning goals. This assessment form promotes students' learning and interpretation of their' performance against specified learning outcomes. In Australia, the vocational education and training (VET) system employs a binary outcome assessment approach to record learning outcomes against competency standards, which are defined as units of competency (Skiba, 2020).

Curriculum and Academic Development (2022) highlighted the importance of engaging students and emphasized the implementation of Criterion-referenced assessment in evaluating the learning process. These are to:

- Establish a common language between students, teachers, and assessors.
- Identifies valuable areas in a curriculum and ensures that what is measured during assessment is the same as the skills, knowledge, and understandings defined by the intended learning outcomes.
- Clearly define for students and assessors the specific evidence of achievement required for each grade standard.
- Enables the assessors to make reliable and valid judgments about students work by comparing their performance with specific criteria, streamlined moderation processes, and providing relevant feedback to students about the quality of their work.
- Enables evaluation of how well students have achieved the unit's taught and identification of teaching, learning, and assessment practices that may need review.
- Supports students in developing strong self-evaluation capacity, providing tools for them to review, refine, and improve their work.

5. Criterion-referenced assessment components

To enhance the skills of vocational education students, practical assessment tools should be implemented that provide detailed information about their skills and potential, preparing them for the labour market. Components of criterion-referenced assessment in vocational education include direct observation, checklists, rating scales, product-based assessment, performance assessment, and a portfolio evaluated using standard criteria, such as a rubric. These components enable assessors to compare their observations with specific criteria. A few out of the various assessment measures used in vocational education are discussed in this study. In criterion-referenced assessment, students are consistently evaluated against standard criteria. Their work is judged based on qualities and attributes that define desired performance. This approach contrasts with norm-referenced assessment, which compares students' performance to their peers by ranking them on a bell curve (Centre for Education Statistics and Evaluation [CESE], 2015). Great School Partnership (2014b), as cited in CESE (2015), found that criterion-referenced assessments are perceived as fairer to students than norm-referenced tests because they evaluate individual achievement against standard criteria, uphold high expectations, and are suitable for measuring learning progress over time, providing essential information teachers can use to improve instruction and school performance.

5.1 Direct observation

This process involves observing the practical skills of vocational education students by subjecting them to the same conditions they would encounter in the real world. This method is widely used to assess candidates' practical skills by engaging them in workplace tasks, thereby improving their skills and competencies. Students who undergo performance assessments can be observed directly in the workplace or in simulated environments that mirror real-world conditions (Bray, 2025). Direct observation provides real-time feedback on student's practical skills and limits bias and plagiarism.

In Australia, observation criteria are used in conjunction with task instructions provided to students, which include tasks requiring students to say, do, write, or create something. These criteria should not be limited to just performance criteria and evidence. The assessment tool should also include criteria for evaluating the quality of work, compliance with health and safety standards, and any other specific requirements that help assessors accurately determine how well the student meets the expected standards. Furthermore, observations should not rely on benchmark answers because observing assesses a candidate's ability to perform specific tasks within a workplace context, whether simulated or real, according to the unit of competency requirements (Skiba, 2020). The advantages of using this method are that it captures authentic performance, demonstrating real-world application, and allows for the immediate correction of errors made by learners, thereby enhancing skill

development. However, this method is time-consuming and may negatively impact students' performance due to feelings of intimidation.

5.2 Checklists

A checklist is a tool used to confirm whether specific components are present or absent in a task, such as completing all parts of an assignment or a lab step, without evaluating the quality or extent of completion (Brookhart, 2018). This is primarily used when evaluating critical aspects of vocational skills. It requires raters or assessors to indicate the performance or what the student omitted, directly observable actions, using a specific checklist tailored to a particular task (Ilgen et al., 2015, as cited in Greatorex et al., 2017). In developing a checklist, the detailed lists of skills or tasks the assessor expects the students to demonstrate should be specified. Each item on the checklist corresponds to a specific criterion. There is much criticism of traditional assessment methods in assessing vocational education students. Some scholars argue that the results from the traditional assessment may lead to a fragmented view of competence, and important aspects such as critical thinking, teamwork, and complex skills may overlap (Winter, 1995, cited in Greatorex et al., 2017). The advantages of this technique are that instructors use it to monitor incremental skill development among learners and assess the criteria demonstrated by learners.

5.3 Rating Scale

Rating scales are defined as "rules that guide scoring which clearly articulate performance expectations and proficiency levels. It can also be referred to as a tool used in the process of assessing student work" (Dawson, 2017; Popham, 1997; Gezie et al., 2012 as cited in Wu, 2021).Examples of rating scales for scoring and assessing students' work include Likert scales, numeric scales, graphic/pictorial scales, semantic differential scales, comparative scales, matrix scales, and others. Two different scores can be obtained from rating scales: A single score assigned to a script based on the overall impression provided by holistic scales, also known as impressionistic scales, which prioritise overall quality. While another set of scores that can be obtained using analytic scales breaks down writing into components for detailed assessment, with which raters rate on several aspects of writing or criteria rather than give a single score (Weigle, 2002; Kabir, 2012 as cited in Wu, 2021). Rating scales facilitate self-assessment by measuring how consistently directions or steps were followed when solving a list of problems (Olson & Krysiak, 2021). Checklists often include criteria or tasks that are either completed or not. While rating scales assign a numerical or qualitative score to criteria, they may not describe what each level looks like in detail.

5.4 Product-based or project-based assessment

The assessment of Project-Based Learning (PBL) evaluates students' practical skills through this innovative, inquiry-based learning model. PBL focuses on subject concepts and principles, utilising various resources and ongoing inquiry-based activities in real-world contexts. This approach enables students to complete comprehensive projects and address interconnected problems within a specified timeframe (Jingfu & Zhixian, 2002, as cited in Zhang & Ma, 2023). This approach focuses on assessing the practical application of skills and knowledge by awarding grades based on the quality of the completed project rather than the process involved. The advantages of using this assessment method are for improving skills acquisition in vocational education, which allows evaluators to assess how well students can apply their knowledge in a practical context and test students' critical thinking and problem-solving skills. The disadvantage is that it may need to accurately reflect a student's skills, as external help from parents or guardians can influence the final product. This method allows instructors to concentrate on skill development and give feedback on areas for improvement in material handling and mastery of practical skills within their specialization.

5.5 Performance assessment

Performance assessment is one of the criterion-referenced assessment techniques used in vocational education. It is a technique examiners use to evaluate an individual's or a group's skills, knowledge, and abilities in performing tasks based on their actual performance in real-world situations. This method requires students to perform specific tasks or generate responses to demonstrate their potential, knowledge, skills, and strategies by creating a product (Rudner & Boston, 1994; Wiggins, 1989, as cited in Stanford SRN Information Booklet, 2008). Performance-based assessments are another important type of assessment that evaluates how students demonstrate their skills in real-world situations. These assessments often include practical exams where learners complete tasks related to their vocational training, applying their knowledge in actual work settings (Education Uplifted, 2020).

The various forms of performance-based assessment methods, including on-demand tasks, which can be structured in the form of paper-and-pencil tasks, equipment, and resource tasks; others are naturally occurring or typical performance tasks, experiments, long-term projects, portfolios, oral presentations, and dramatizations (Gyamfi et al., 2023). If all these are used in vocational education, the challenges faced by assessors in the traditional assessment (norm-referenced) can be easily overcome. The student's views on the difficulties of some concepts in vocational education can be best addressed by applying their knowledge to the real world. It can be used for both formative and summative purposes.

5.6 Portfolio Assessment

A portfolio is another method for assessing students in vocational education by linking their performance to specific decision-making processes. According to Roeber (2002), as cited in Mertens (2010), a portfolio is defined as a deliberate and organized collection of student work that is assessed and measured against established scoring criteria. A portfolio is a type of assessment used for creating and gathering work, such as videos, pictures, logbooks, and documents, to demonstrate progress toward and achievement of topic or course objectives (Bray, 2025).

Portfolios are viewed as both product and process-oriented tools that help learners monitor and reflect on their learning and obtain feedback (UNSW, 2014, as cited in CESE, 2015). According to CESE (2015), the two assessment tools that have particular currency and broad application are portfolio-based assessment and criterion-based assessment.

Yoo et al. (2020) further explain that a portfolio involves a learner collecting evidence supporting their educational journey, including reflections on their progress and accomplishments. This comprehensive evaluation method provides a solid foundation for growth in expertise, knowledge, technical skills, and understanding through self-reflection. According to CESE (2015), a portfolio is a systematic collection of a student's work and related materials that showcase their activities, accomplishments, and achievements across one or more subjects.

Portfolios emphasize higher-order thinking and the ability to synthesize information and evidence, fostering greater creativity. They can include real-world tasks, making them a valid and authentic assessment method (Curriculum & Academic Development, 2022). Once the criteria are set, students can gather information from their earliest educational work. In this case, students select the best work from their work-in-progress portfolios, including rough drafts, idea jottings, data collection, drawings, and activity photos (Shackleford, 1996, as cited in Wagner, 1998). Fernsten (2009), as cited in CESE (2015), found that portfolios may take various forms, including:

•Process of showcasing and highlighting the best products over time

• Process that focuses on the 'journey' of learning

• Exhibit a series of evaluations over a course and the learning or accomplishments of the student with previously determined criteria or goals.

This assessment procedure will encourage self-reflection and long-term skill growth among learners. Learners will be able to identify their strengths and gaps through the feedback provided. When assessing the portfolios submitted by vocational education students, a rubric must be designed to evaluate their work.

Portfolio assessment is a common example of performance assessment in practice. Adopting this assessment technique in improving vocational skills, it is expected that detailed feedback will be provided on how well students meet each criterion, highlighting strengths and areas for improvement to guide skill development and reinforcing technical skills that will align with workplace demands.

5.7 **Rubrics**

Rubrics are scored by evaluating a student's work using descriptive criteria and converting these evaluations into an overall judgment or score of the assignment's quality. Designing a rubric, an effective one should include clear criteria aligned with the assignment's goals. These criteria should reflect the aspects on which student work is assessed, along with qualitative descriptions that differentiate various levels of student performance for each criterion (Goldberg, 2014, as cited in Olson & Krysiak, 2021; Arcuria & Chaaban, 2019).

A rubric is a multi-purpose scoring guide for assessing student products and performances. It is also a detailed scoring guide that defines performance levels across various criteria. Rubrics are not rigid tools but versatile

instruments that can be flexibly adapted to different subjects and contexts. This adaptability makes them a valuable asset in the assessment process, ensuring a comprehensive and fair evaluation of student work and making educators/evaluators feel just and equitable in their assessment. Wolf and Stevens (2007) provide an example of a rubric used to judge a springboard diver's performance, clarifying how judges should rate the dive. It provides a structured approach based on the judges' professional experience and knowledge, enabling them to apply the specified criteria effectively.

Wolf and Stevens (2007) state that springboard has different meanings depending on the context. It is a structured evaluation tools that consist of the following:

- Specific elements (criteria)
- Performance level
- Scoring guide

Mertens (2010) found that rubrics can assess complex tasks by breaking down performance into components. To achieve this, there is a need to develop a good rubric following the criteria below:

- Ensure the rubric addresses the most critical aspects of student performance.
- Verify that the rubric aligns with the instructional outcomes to be measured.
- Check for extraneous elements in the rubric; revise or choose a different rubric if necessary.
- Do not focus excessively on the rubric's stated grade level, as it may be applicable across different grades with minimal modification.
- Consider adapting rubrics from various subject areas to suit your needs. For example, skill reading rubrics can be used to assess listening, writing rubrics might be modified for evaluating speaking, and fine arts rubrics could be applied across different art forms.
- Ensure the rubric is clear and easy to understand.
- Test the rubric with actual samples of student work.
- Confirm that you and your colleagues can generally reach a consensus on the scores assigned to student work (Stix, 1997, as cited in Mertens, 2010).

The analytic and holistic rubrics can be used to assess competency, vocational skills, technical skills, and performance. If these procedures are followed, the rubric will promote consistency and accuracy in the instructors' evaluation process, measuring performance against the same standards. Rubrics are valued and widely used by higher education instructors for assessment that provides various benefits, including offering consistent feedback to students and cutting down the total time spent on grading.(Arcuria & Chaaban, 2019).

6. Practical implications for using criterion-reference assessment

The practical implications of criterion-referenced assessments (CRA) differ from those of norm-referenced assessments. CRA measures performance against specific standards, unlike norm-referenced assessments, which compare students' performance to that of their peers. The practical implications for using CRA are:

6.1 Feedback for Improvement: Provide detailed feedback through rubrics and performance reports, enabling vocational education students to identify their strengths, where they excel, and pinpoint specific job-related skills, rather than focusing on outperforming peers.

6.2 Support for Instruction: Identifies what students can do and where they need improvement, allowing instructors to tailor lessons on specific technical skills and address curriculum gaps to meet each student's unique needs

6.3 Motivates Students: Encourages students to pursue clear, defined goals, rather than competing with peers, thereby fostering personal growth and motivation.

6.4 Mastery and Certification: Demonstrates students' actual capabilities, making it valuable for assessing readiness for certifications or licensing exams. It confirms whether a student has achieved the necessary skills for professional qualifications.

6.5 Enhance Program Evaluation: Assists educators and institutions in assessing the effectiveness of educational or training programs by determining whether students meet specific objectives, such as workplace skills, and modifying programs to prepare students for industry requirements.

6.6 Focus on Achieving Standards: Evaluates students to determine whether they meet industry standards.(Green, 2002; Study Smarter, n.d; Sternberg et al., 2022)

7. Conclusion

In today's world, where self-reliance and individual potential are highly valued, the norm-referenced assessment method often fails to accurately identify each student's unique capabilities. Criterion-referenced assessment (CRA) methods are suitable for evaluating students' skills and potential in vocational education. This approach enhances skills acquisition in vocational education by assessing students against predefined performance standards rather than comparing them to peers. Implementing criterion-referenced assessment in vocational education enables assessors to focus on individual performance against specific standards using CRA components, such as performance assessments, direct observations, checklists, rating scales, product-based or project-based assessments, rubrics, and portfolios. This provides a comprehensive view of each student's academic, vocational, generic workplace, and technical skills, as well as their potential in their area of specialization. Adopting criterion-referenced assessment (CRA) in vocational education programs helps in strengthening students' mastery of skills, fosters a competent, job-ready workforce, and empowers them vocationally. Aligning vocational content with industry expectations, CRA helps educators and institutions identify students' strengths and weaknesses in their specialization. Skill acquisition in vocational education becomes more structured, measurable, and aligned with industry needs, thereby enhancing learners' employability skills when applied in practice.

Recommendations

Based on the discussions and conclusions drawn from this paper, improving student skills acquisition by integrating criterion-referenced assessment methods during the evaluation process, the following recommendations were made:

1. Curriculum planners and other sectors in vocational schools, training centres, and technology tertiary institutions should place greater emphasis on using criterion-referenced assessment components to identify the potential of individual students or training that aligns with industrial standards and job requirements.
2. Vocational teachers/instructors should ensure that the criterion-referencing assessment process applies when conducting formative and summative evaluations.
3. The educational sectors, in collaboration with different examination bodies, should organise seminars and workshops on how teachers, instructors and assessors can develop comprehensive CRA components that outline the criteria for each level of performance development in a specialised area.

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