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IDENTIFICATION OF PRACTICAL TASKS AND SKILLS NECESSARY FOR PRACTICAL WORK ASSESSMENT IN FOUNDRY CRAFT PRACTICE IN TECHNICAL COLLEGES IN NIGERIA

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ABSTRACT

Inadequate assessment instrument can either over rate or under rate a student's practical performance. An over rated student will graduate with the wrong grade and may perform below expectation when employed or in advance studies. This will certainly be embarrassing to him/herself as well to the institution that graduated him/her. An under rated student will naturally express dissatisfaction and frustration; which can lead to drop-out, deviant behavior, hooliganism, crime and all forms of negative vices that can become a great threat to security within the colleges and the society at large. This situation necessitated the determination of practical tasks and skills required for assessing Practical Work in Foundry Craft Practice in Technical Colleges in Nigeria. Two research questions guided the study. The study adopted descriptive design. The area of the study was south east and south west geopolitical zone of Nigeria. The population for the study was 20 teachers/instructors teaching foundry craft practice in technical colleges. Foundry craft practical skills assessment instrument (FCPSAI) was used for data collection. The instrument was face validated by three experts. The reliability coefficient of the instrument was found to be 0.83, indicating that the instrument was reliable. Findings from the study indicated that 10 practical task items, and 83 practical skill items, were found to be suitable for inclusion in the instrument. Based on the findings, it was recommended among others that Foundry craft practice trade teachers should include all the identified practical task in the instrument used in assessing students' practical skills in foundry craft practice in technical colleges in Nigeria. Furthermore, Government at all level should organize workshops, conferences and seminars to train foundry craft practice teachers on the identified practical task and skill.

Keywords: Validation, Instrument, Assessing, Skills, foundry**.**

Introduction

In the present day Nigeria, greater emphasis is being placed on industrial and technological development. As a result, students ought to be motivated to take up courses in technical and vocational education. Technical and vocational education has been characterized as a vital form of education that provides the trained manpower needed for industrial and technological development of any nation (Okoye and Auta, 2020). According to Audu, Umar, Atsumbe, Ma'aji and Adedokun (2020), technical and vocational education (TVE) provides the recipients with the basic knowledge and practical skills necessary for entry into the world of work as employees or as self-employed. This type of education can be offered in technical colleges. In Nigeria, Technical

colleges produces craftsmen at the craft level and master craftsmen at the advance craft level (FRN, 2013). Studies at the technical colleges lead to the award of National Technical Certificate (NTC) and Advance National Technical Certificate (ANTC) (National Board for Technical Education NBTE, 2001). Furthermore, Technical Colleges curriculum is designed in a multi-dimensional and multi-disciplinary structure to contain various units in which students acquire various technical skills and one of such unit is foundry craft practice.

According to Kehinde (2020), foundry craft practice includes the manufacturing of metal products from liquid to solid without intermediate operation of mechanical workings such as rolling, fabrication or forging. Foundry craft practice involves the process of producing metal component parts of desired shapes by pouring the molten metal into a prepared mold and then allowing the metal to cool and solidify (Dhairya, Gunjan, Aman and Shrikant 2015; Munkaila 2021). The solidified piece of metal is known as casting. According to Abdullahi (2020), foundry craft is one of most significant and fundamental process in manufacturing industry, which involves pouring a liquid content into a hollow mold until the content cools and solidifies to form the desired shape. From the above, it is right to say that foundry craft practice encompasses a balance of both theory and practical activities that is involved in the production of goods and services by the use of tools, equipment and materials. Therefore, according to NBTE (2014) foundry craft practice in Nigeria technical colleges is expected to produce competent and skilful craftsmen and technicians who are able to produce all types of machine components and parts, modern equipment for transportation, communication, power, agriculture, construction and other industries (Ehijele and Ugochukwu, 2018). Unfortunately, the advantage of profitable casting production in foundry craft has not been well explored; but instead, foundry craft students continue to search for white collar jobs in government ministries and agencies while some of them undertakes and build their interest in a non-foundry productions. The decreasing interest of the graduates in taking foundry craft as a career on graduation is as a result of their poor technical skills caused by poor workshop practice (Nwigbo, 2019).

Workshop practice is widely known and has been in use in school workshops as a technique or way of teaching technical subjects. It necessarily follows that, wherever this method of teaching is employed to teach students either in group or otherwise, there is necessity to engage some unique method of assessing such practices or activities (Okorie, 1988; Ezeji, 1996). This way, practical work learnt will increase students' knowledge of tools and materials as well as develop skill and quality attitudes towards job. Following the above, the Federal Republic of Nigeria adequately emphasized the significance of practical work in technology education (FRN, 2013), especially at the basic level. In clear terms, the objective of the technical college programme is that students should be trained to acquire practical knowledge/skills required for their own well-being and for national development. This simply imply that the involvement of foundry craft students in practical work in other to bring about production of things either single-handedly or in group calls for some degree of assessment. Assessment determines learning outcomes in relations to skills, attitudes, knowledge, aptitude and capability attained in the course of study by employing adequate instrument. An instrument is the standard activities established to support the assessment method and used to gather the data of student competence (Australia Skills Quality Authority ASQA, 2020). From the

above, assessment therefore, is a methodical process of judging the worth, effectiveness or suitability of something, according to specified criteria. Okorie and Ezeji(1985) emphasised that whenever students are engaged in practical work, be it individual or in groups, some exceptional methods of assessing their practical activities is required. The techniques of assessment in practical subjects like foundry craft practice required an assessment which encourages the practice of using rating scales or checklist on students as they substantially carry out some given practical tasks.

Practical tasks in foundry craft practice in technical college curriculum involve some skills that are necessary to get given tasks or jobs done in patternmaking, core making, molding, melting and pouring as well as cleaning and other required finishing operations. It is imperative that students do these tasks with the aid of tools and necessary equipment and at the same time, the assessor should assess their activities with reference to some valid test items. However, competence cannot be adequately determined without a clear description of behavioral skills that are involved in the steps to complete a job. Therefore, Foundry craft practice teachers in technical colleges should be assessing students' practical skills on the processes involves and the completed job (product). Inappropriately, it was observed that The National Business and Technical Examination Board (NABTEB) continuously uses a marking scheme checklist to assess foundry craft students' performance in the practical components of NTC examinations. The structure of the NABTEB marking scheme checklist favor the cognitive domain assessment and does not satisfactorily address the psychomotor aspects of foundry craft practice. In other words, NABTEB prepared and sends practical examination question papers to technical colleges two to three weeks before the examination date, instructing the students to produce products in the workshop without their teacher's involvement. Thereafter on the examination day, an examiner is send to each college to rate products and awards marks based on the end results of student's activities using marking scheme checklist.

The checklist does not sufficiently highlight the tasks and skills to be assessed, hence lacks details of the various stages of specific skills involved in the process of carrying out the given tasks. Consequently, Foundry craft practice students' practical performance has been assessed with inadequate instruments. This confirmed the fact that the researcher observed that most of the students graduate with good grades, but they are not very competent in practical skills which limit their prospects for self-employment. This suggests that the students were merely handed an undeserved grade without adequate assessment instrument. Consequently, Nigeria continue to rely solely on imported foundry products such as connecting rods, gears, steering knuckles, carburetor bodies, crank cases, cylinder block, pistons, engine block, cylinder heads, crank shafts and other domestic product and their molds.

It is against these situations that this study is intended to ascertain practical tasks and skills necessary for practical work assessment in foundry craft practice in Technical Colleges in Nigeria

Research Questions

The following research questions guided the study:

1. What are the practical task contents appropriate for inclusion in the instrument for assessing practical work in in foundry craft practice in Nigeria?
2. What are the practical skills in foundry craft practice appropriate for inclusion in the instrument for

assessing practical work in in foundry craft practice in Nigeria?

Research Hypotheses

The following null hypotheses were postulated and tested at 0.05 level of significance

1. Foundry craft practice teachers (B.Ed., HND, and FTC) do not differ significantly in their ratings of the task contents to be included in the instrument for assessing practical work in in foundry craft practice in Nigeria.
2. Foundry craft practice teachers (B.Ed., HND, and FTC) do not differ significantly in their ratings on the practical skills to be included in the instrument for assessing practical work in in foundry craft practice in Nigeria.

Research Method

The study uses descriptive survey research design. This design was adopted for this study because it enables the researcher to elicit information from the entire population. The area of the study is all the NBTE accredited technical colleges offering foundry craft practice in South East and South West geopolitical zone of Nigeria. The population for this study is 20 teachers/instructors teaching foundry craft practice in technical colleges in South East and South West geopolitical zone of Nigeria. Foundry craft practical skills assessment instrument was used to collect data for the study. The instrument was developed based on the NBTE curriculum for foundry craft practice. The instrument consists of two parts, structured in line with the research questions. Section A seek for information on academic qualifications for teachers according to the possession of B.Sc. Industrial Technical Education Degree, HND /PGDE and ANTC /Full Technology Certificate /TTC, Part B of the instrument addressed foundry craft practice. Part B is further divided into two sections, Section A dealt with the practical tasks content of FTPSAI. Section C is concerned with the practical skills of FCPSAI. Five-point rating scale of Very Suitable (VS), Suitable (S), Moderately Suitable (MS), Unsuitable (US), and Very Unsuitable (VU) were written against each statement. This was provided to assist the teachers identify the suitability of each item for inclusion in the instrument. The instrument was given to three experts for validation: two from foundry and forging unit of Metalwork Department, Federal College of Education (Technical), Umuze, Anambra State while the remaining one is an expert in measurement and evaluation at Federal College of Education (Technical), Asaba, Delta State. The instrument was administered on the foundry craft teachers. To ascertain the reliability of the draft practical skills assessment instrument, copies of the instrument were administered on six foundry technology practice teachers from federal college of education (technical) Umuze, Anambra State. This technical institution is situated in the same geopolitical zone, therefore share common attributes. At the end, Cronbach Alpha coefficient formula was used to analyze the data of every section and reliability was found to be 0.90, 0.89, and 0.85 for sections A to C respectfully. Overall reliability was found to be 0.88. The instrument was therefore concluded to be reliable for use for the study because the general rule according to (Downing, 2004) is that reliability greater than 0.80 are considered as high. To answer research questions 1, and 2, identified practical tasks and practical skill items were analyzed using mean statistics.

Presentation of Results

Research Question 1: *What are the practical task contents appropriate for inclusion in the instrument for assessing*

practical work in in foundry craft practice in Nigeria?

Table 1: Mean Ratings of Practical Tasks Contents Suitable for Inclusion in the Foundry Craft Practical Skills Assessment Instrument

S/No	Practical tasks	Mean	Remarks
1	Pattern layout	4.60	Suitable
2	Pattern construction	4.55	Suitable
3	Preparation of core sand	4.60	Suitable
4	Core forming	4.50	Suitable
5	Core baking	4.45	Suitable
6	Core finishing	4.65	Suitable
7	Molding	4.80	Suitable
8	Melting	4.80	Suitable
9	Casting	4.80	Suitable
10	Finishing	4.75	Suitable

The Mean rating of the practical task contents ranged from 4.45 to 4.80 as could be seen in the analysis presented in Table 1. The least Mean was noted on task 5 which is core baking. The highest Mean of 4.80 was obtained by task items no 14, 15 and 16. All the asks had mean greater than the cutoff point of 3.50 and were considered suitable.

Research Question 2: *What are the practical skills in foundry craft practice appropriate for inclusion in the instrument for assessing practical work in in foundry craft practice in Nigeria?*

Table 2: Mean Ratings of Practical Skill Contents on Pattern Layout

	Task 1: Pattern layout	Mean	Remarks
11	Read blue-print of drawings	4.45	Suitable
12	Design patterns from blue-print of drawing	4.10	Suitable
13	Create two view of the drawing on a sheet using shrink rule	4.30	Suitable
14	Add machine allowance to the design	4.25	Suitable
15	Provide draft allowance to the design	4.25	Suitable

Analysis in Table 2 indicated that the mean ratings of Practical skill contents on pattern layout ranged from 4.10 to 4.45. Based on this premise, all the items were considered acceptable, appropriate and suitable for inclusion into the Foundry Craft Practical Skills Assessment Instrument (FCPSAI) For Technical Colleges

Table 3: Mean Ratings of Practical Skill Contents on Pattern Construction

	Task 2: Pattern construction	Mean	Remark
16	Establish the number of parts that pattern will be made	4.45	Suitable
17	Identify pattern making materials	4.55	Suitable
18	Measure patterns material accurately	4.25	Suitable
19	Use a marking out gauge to see if board is at right thickness.	4.15	Suitable
20	Secure the board flat on the bench.	4.20	Suitable
21	Mark out pattern correctly	4.25	Suitable
22	Plane the two pieces of board to be joined to required length, thickness and width	4.15	Suitable
23	Fasten board properly on bench and with plane,	4.15	Suitable
24	Assemble the two pieces of board with glue and strengthen it with nails or screws.	4.10	Suitable
25	Chisel off part of a wood to make a mortise and tenon joint.	4.10	Suitable
26	Set out position for mortise and tenon joint.	4.25	Suitable
27	Construct butt joint with dowels.	4.30	Suitable

28	Fastening each half of a split pattern to the opposite sides on one plate	4.35	Suitable
29	Build fillets in a pattern without destroying the pattern.	4.35	Suitable
30	Fill wax in all fillets in order to remove sharp corners	4.30	Suitable
31	Give a shellac coating to pattern	4.35	Suitable
32	Colors the pattern for identification purpose	4.40	Suitable
33	Construct pattern to a given specification	4.55	Suitable

Table 3 shows the respondents mean ratings for the test items for assessing practical performance on pattern construction. The mean ratings ranged from 4.10 to 4.55. As could be seen, all the test items had mean ratings that qualified them as appropriate and acceptable/suitable for the instrument. Therefore, all the test items were found suitable for inclusion into the instrument having been rated above 3.50 which is the cut-off point.

Table 4: Mean Ratings of Practical Skill Contents on Preparation of Core Sand

	Task 3: Preparation of core sand	Mean	Remark
34	Select appropriate materials	4.65	Suitable
35	Choose correct sand type	4.65	Suitable
36	Carryout sand testing	4.55	Suitable
37	Assemble the materials to correct specification	4.60	Suitable
38	Mix the material	4.75	Suitable
39	Apply the right quantity of water	4.80	Suitable

Analysis result in Table 4 gave mean ratings of Practical skill contents on preparation of core sand items in a range of 4.55 to 4.80. Going by those mean ratings, the whole six items were suitable for inclusion into the instrument. The items were therefore, retained because they had mean ratings greater than the cut-off mark of 3.50 already set for selecting the test items.

Table 5: Mean Ratings of Practical Skill Contents on Core Forming

	Task 4: Core Forming	Mean	Remark
40	Set the core box on a work bench	4.20	Suitable
41	Fill the core box	4.35	Suitable
42	Rammed the prepared sand into core box	4.30	Suitable
43	Remove the extra sand from the core box	4.20	Suitable
44	Reinforced the core to ensure coherence and stability	4.20	Suitable
45	Invert the core box over the core plate	4.40	Suitable
46	Provide vent holes to allow gases to escape	4.40	Suitable

Result of Table 5 shows that the mean ratings of the respondents on the seven practical skill items ranged from 4.20 to 4.40. The least mean ratings were obtained from test items 40, 43 and 44 which were on ability to set the core box on a work bench, Remove the extra sand from the core box and ability to reinforce the core to ensure coherence and stability. Test items 45 and 46 had the highest mean ratings. However, all the test items (7 in number) had mean ratings greater than 3.50 and were therefore considered suitable for the task.

Table 6: Mean Ratings of Practical Skill Contents on Core Baking

S/No	Task 5: Core Baking	Mean	Remarks
47	Determine the right furnace for the job	4.55	Suitable
48	Set the furnace to the accurate baking temperature of 100 degree Celsius	4.40	Suitable
49	Choose the baking time/hours	4.25	Suitable
50	Observes the baking time/ hours determined	4.25	Suitable

Table 6 analysis showed that mean ratings of the respondents on the four practical skill items ranged from 4.25 to 4.55. All the items had mean ratings greater than 3.50 and were considered appropriate and suitable for inclusion into the instrument

Table 7: Mean Ratings of Practical Skill Contents on Core Finishing

S/No	Task 6: Core finishing	Mean	Remarks
51	Carryout felting operation on the core i.e trimming, brushing, coating etc.	4.50	Suitable
52	Check and correct the various dimensions by inserting fixture	4.25	Suitable
53	Perform pasting of the core	4.40	Suitable

The analysis result in Table 7 showed that mean ratings of the respondents on the three practical skill items ranged from 4.25 to 4.50. All the items had mean ratings greater than 3.50 and were considered appropriate and suitable for inclusion into the instrument.

Table 8: **Mean Ratings of Practical Skill Contents on Molding**

	Task 7: Molding	Mean	Remarks
54	Choose appropriate materials	4.40	Suitable
55	Group the materials to correct specification	4.40	Suitable
56	Blend the material	4.45	Suitable
57	Spread over the right quantity of water	4.45	Suitable
58	Set the drag flask on the board	4.60	Suitable
59	Sprinkle dry facing sand on the board	4.50	Suitable
60	Rammed the prepared sand into mold box	4.30	Suitable
61	Removal of the excess sand with a strike rod.	4.30	Suitable
62	Construct vent holes to allow gases to escape	4.20	Suitable
63	Place wire in mold sections to reinforce molds, using hand tools and glue	4.10	Suitable
64	Clean and smooth the mold	4.20	Suitable
65	Sprinkle parting sand on patterns and mold sections to ease removal of Patterns from molds.	4.40	Suitable
66	Place patterns inside mold sections	4.45	Suitable
67	Remove the pattern from the mold sections	4.30	Suitable
68	Cut, runner holes sprue holes and spouts into molds	4.25	Suitable
69	Place cores into lower sections of molds,	4.25	Suitable
70	Reassemble molds for pouring	4.50	Suitable

Data presented in Table 8 indicated that all the seventeen practical skill items presented had their mean rating greater than 3.50. Based on this, it was concluded that the seventeen practical skill items were found to be appropriate for inclusion in the foundry craft practical skills assessment instrument.

Table 9: Mean Ratings of Practical Skill Contents on Melting

	Task 8- Melting	Mean	Remarks
71	operate melting furnaces	4.30	Suitable
72	Carry out tapping operations	4.20	Suitable
73	Carryout furnace linings,	4.10	Suitable
74	Determine molten metal temperature	4.30	Suitable
75	Operate thermocouples, optical and pyrometers	4.40	Suitable
76	Carryout fluidity testing	4.45	Suitable
77	Measure casting temperature	4.40	Suitable

As shown in Table 9, respondents rated all the 7 practical skill items suitable for use in the final instrument with mean ratings ranging from 4.10 to 4.45. The 7 practical skill items were adjudged acceptable to be included in the instrument, since all the items had mean ratings greater than 3.50.

Table 10: Mean Ratings of Practical Skill Contents on Casting

S/No	Task 9- Casting	Mean	Remarks
78	Carryout slag and dross removal	4.35	Suitable
79	selecting ladle	4.25	Suitable
80	checking ladle	4.25	Suitable
81	preparing ladle for pouring	4.25	Suitable
82	transferring metal to ladle	4.10	Suitable
83	carrying molten metal treatment	4.55	Suitable
84	Selecting molten metal	2.05	Unsuitable
85	sampling and testing molten metal	4.30	Suitable
86	pouring molten metal into molds	3.90	Suitable

Data presented in Table 10 indicated that 8 out of the 9 practical skill items presented had their mean rating greater than 3.50. Only item 84 mean rating was less than 3.50. Based on this, it was concluded that 8 practical skill items were found to be appropriate for inclusion in the foundry craft practical skills assessment instrument.

Table 11: Mean Ratings of Practical Skill Contents on Finishing

S/No	Task 10- Finishing	Mean	Remarks
87	conveying completed castings from one section to another	4.25	Suitable
88	Remove gates, feeders, risers, and fins from castings	4.25	Suitable
89	file to smoothen cast with hand files	4.25	Suitable
90	Sandpapering operation	2.05	Unsuitable
91	Carryout heat treatment on cast	4.40	Suitable
92	Carryout inspection of finished products	4.25	Suitable
93	Salvage defective castings if required	4.35	Suitable
94	Carryout dust and noise control	4.20	Suitable
95	Carryout destructive testing of castings	4.40	Suitable

Analysis in Table 11 indicated that the mean ratings of practical skill items ranged from 2.05 to 4.40. Based on this premise, all the test items were considered acceptable, appropriate and suitable for inclusion in the foundry craft practical skills assessment instrument except items 90 with mean rating of 2.05.

In general, 83 items out of the 85 practical skill items under consideration had mean ratings above 3.50 and were found to be appropriate for inclusion in the foundry craft practical skills assessment instrument.

The remaining two practical skill items that had mean ratings less than 3.50 were considered unsuitable for inclusion in the instrument and were subsequently dropped .

Hypothesis 1: *Ho: Foundry craft practice teachers (B.Ed., HND, and FTC) do not differ significantly in their ratings of the task contents to be included in FCPSAI.*

Table 12: One-way ANOVA result of Foundry Craft Practice Teachers' and Task Contents

	N	Mean	Std. dev.	D.f.	F calculated	F critical	P – Value	Decision
B.Sc.	4	4.67	.31	2, 17	0.68	2.37	0.52	Accept H_0
HND	6	4.76	.26					
ANTC/FTC	10	4.57	.37					
TOTAL	20	4.65	.32					

SOURCE: SPSS output

A one-way analysis of variance (ANOVA) test was used to determine if there was difference in mean ratings of the task contents to be included in FCPSAI between the foundry craft practice teachers in B.Sc., HND, and FTC. The descriptive analysis reveals that there is no much difference in the mean rating of the task contents to be included in FCPSAI among the three practical teachers of B.Sc. *(mean = 4.67, Std. Dev. = 0.31);* HND *(mean = 4.76, Std. Dev. = 0.26);* and ANTC/FTC (*mean = 4.57, Std. Dev. = 0.32).*

The result presented in Table 12 also showed that; there was statistically insignificant difference between the mean ratings of the task contents to be included in FCPSAI among the three practical teachers as determined by one-way ANOVA. The null hypothesis was accepted because; $F_{(2,17)} = 0.68$ is less than the $F_{critical} = 2.37$ and p-value = *0.52* is greater than the level of significant = *0.05* at *2, 17* degree of freedom. The decision reached here as determined by the one-way ANOVA is that; foundry craft practice teachers (B.Ed., HND, and FTC) do not differ significantly in their ratings of the task contents to be included in FCPSAI.

Hypothesis 2: *Ho: Foundry craft practice teachers (B.Ed., HND, and FTC) do not differ significantly in their ratings on the practical skills to be included in FCPSAI.*

Table 13: One way ANOVA result of Foundry Craft Practice Teachers' and practical skills

Teachers	N	Mean	Std. dev.	D.f.	F calculated	F critical	P – Value	Decision
B.Sc.	4	4.07	.30	2, 17	1.34	2.37	0.29	Accept H_0
HND	6	4.36	.16					
ANTC/FTC	10	4.32	.34					
TOTAL	20	4.28	.29					

SOURCE: SPSS output

A one way analysis of variance (ANOVA) test was employed to determine if there was difference in mean ratings of the practical skills to be included in FCPSAI between the foundry craft practice teachers in B.Sc., HND, and ANTC/FTC. The descriptive analysis reveals that there is no much difference in the mean rating of the practical skills to be included in FCPSAI among the three practice teachers of B.Sc.

(mean = 4.07, Std. Dev. = 0.30); HND *(mean = 4.36, Std. Dev. = 0.16);* and ANTC/FTC (*mean = 4.32, Std. Dev. = 0.34).*

The result presented in Table 13 also indicated that; there was statistically insignificant difference between the mean ratings of the practical skills to be included in FCPSAI among the three practical teachers as determined by one-way ANOVA. The null hypothesis was accepted because; $F_{(2,17)} = 1.34$ is less than the $F_{critical} = 2.37$ and p-value = *0.29* is greater than the level of significant = *0.05* at *2, 17* degree of freedom. The decision reached here as determined by the one-way ANOVA is that; foundry craft practice teachers (B.Ed., HND, and FTC) do not differ significantly in their ratings of the practical skills to be included in FCPSAI.

Discussion of Findings

Finding on research question 1 shows that, ten practical tasks were found to be appropriate for inclusion in the foundry craft practical skills assessment instrument (FCPSAI). These task clusters identified agreed with Hassan (2019) who opined that practical task operations are group in different clusters. Students are expected to perform the tasks in foundry craft practice trade during practical exercises. Similarly, suggestions by UNESCO (2000) and Aminu (2015) hold similar views that, the first thing in developing an instrument is to specify the purpose, develop table of specification and select relevant task clusters. Findings from research question 2 revealed that 83 practical skill items were found to be suitable for inclusion in the foundry craft practical skills assessment instrument. This finding is in agreement with the works of Ramli, Talib, Hassan, and Manaf (2020), Okoye and Auta (2020) and Tsado (2013). Emphases in their works revealed that practical skill items that satisfied all psychometric properties are enough and adequate for inclusion in assessment instrument. However, this finding is in disagreement with the study of Effiong (2006) who carried out a study on development and validation of alternative to practical test for measuring skills in electronics device and circuit in technical colleges. According to the instrument developed by Effiong, students must not necessarily to go to the workshop to conduct practical for the practical skills in their possession can be measured, instead, an instrument with alternative to workshop practice items can be develop to measure same construct.

Hypothesis results presented in Table 12 also showed that; there was statistically insignificant difference between the mean ratings of the task contents to be included in FCPSAI among the three practical teachers as determined by one-way ANOVA. The null hypothesis was accepted because; $F_{(2,17)} = 0.684$ is less than the $F_{critical} = 2.37$ and p-value = *0.52* is greater than the level of significant = *0.05* at *2, 17* degree of freedom. Similarly, the result presented in Table 13 also indicated that; foundry craft practice teachers (B.Ed., HND, and FTC) do not differ significantly in their ratings of the practical skills to be included in FCPSAI. The null hypothesis was accepted because; $F_{(2,17)} = 1.34$ is less than the $F_{critical} = 2.37$ and p-value = *0.29* is greater than the level of significant = *0.05* at *2, 17* degree of freedom. This was a pointer to show that the three group of foundry craft teacher closely agreed in their mean ratings of task contents/practical skills to be included in FCPSAI despite different practical and pedagogical exposures during their training in schools. These findings corroborated the fact that the backgrounds of foundry craft practice process date back about 5,602 years to ancient Mesopotamia and apart from few modern innovations in the molds themselves, the process has remained relatively unchanged since then (Abdullahi,

2020). However, the results of this study is in disagreement with that of Okeme (2011). In okeme study there were significant differences in the mean scores of the high and low abilities nevertheless there were no significant difference in the mean scores of the high and average abilities.

Conclusion

The study identified practical tasks, and practical skills contents suitable for inclusion in the FCPSAI. Moreover, the findings of this study have identified 10 practical tasks, and 83 practical skills contents. It is expected that when these tasks and skills identified are incorporated into the instrument for assessing students in foundry craft practice, it will exposed the student to the amount of skills they required in the course of their studies. This will assist significantly in passing a valid judgment about the level of ability the students might have gotten in handling practical task component of the trade which will form the basis for their certification.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. Foundry craft practice trade teachers should include all the identified practical task in the instrument used in students' practical skills assessment in foundry craft practice in technical colleges in Nigeria.
2. Foundry craft practice trade teachers should include all the identified practical skills in the instrument used in students' practical skills assessment in foundry craft practice in technical colleges in Nigeria.
3. Government at all level should organize workshops, conferences and seminars to train foundry craft practice teachers on the identified practical task and skill

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