DEVELOPMENT OF AN INSTRUMENT FOR ASSESSMENT OF STUDENT’S PROCESS SKILLS IN CAKE MAKING IN ABIA STATE COLLEGE OF EDUCATION (TECHNICAL) AROCHUKWU

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Abstract
The paper presented the procedure for the development and validation of an instrument for assessment of student’s process skills in cake making in Abia State College of Education (Technical) Arochukwu. The study adopted instrumentation design. The population of the study consisted of 15 lecturers and students (5 lecturers and 10 students) in the Department of Home Economics in Abia State College of Education (Technical), Arochukwu. Three research questions were formulated to guide the study. No sample and sampling technique for the study as the population of the study was small and manageable. Cake Making Process Skills Assessment Instrument (CAMPSAI) was first drafted. 30 copies of CAMPSAI were distributed to lecturers whom were the study respondents. The data collected from the instrument were subjected to factor analysis which revealed 52 test items suitable to be included in the instrument. The instrument was later validated by eight experts in Food and Nutrition in Michael Okpara University of Agriculture, Umudike. The validation resulted to the retention of all the 52 process skills test items in the instrument. The instrument was finally subjected to reliability test and the reliability of the entire instrument using Cronbach alpha was found to be 0.81, confirming that the instrument is very reliable. Based on the findings of the study, the researchers recommended among others that the developed instrument should be adopted in process skill assessment of students in all areas of Home Economics in Colleges of Education, Polytechnics and Universities, Government/Staff welfare unit of the institutions should organize seminars and workshops for lecturers and teachers of Home Economics on importance of practical process assessment, School Administration should make process assessment compulsory in all Vocational and Technical Education programs in general and Home Economics in particular to encourage the use of the developed cake making practical process skills instrument for assessing students in cake making.

Keywords: Development, Validation, Assessment, Process Skills and Cakamaking

Introduction
In Nigerian institutions, Home Economics is taught at all levels of education (basic, secondary and tertiary). Home Economics is one of the core vocational subjects which helps to educate the students and
equip them with skills to face life challenges (Ifeanyi – Uche, 2013). As outlined by Azubuike (2014), Home Economics is a field of study that seeks to understand the relationship between principles, laws, conditions and ideologies concerned with people’s immediate physical environment and their nature as a social being. In more simple terms, Okoro (2013) stated that Home Economics is an applied science that involves the study of activities that relate to the home and the family. Home Economics is regarded as a unique vocational course due to its dual function of equipping individuals with skills for certain wage-earning occupations and open doors to many job opportunities for its graduates owing to the numerous skills acquired during the course of study (Akande, 2013).

Operationally, Home Economics is viewed as a vocational subject area which instils in its students the attributes of entrepreneurship, productivity, creativity and lifelong learning. It is a discipline made up of different subject areas. Home economics is a subject that passes knowledge and skills from the grass root level of society which is the home/family to areas like Dietetics, Nursery and Day-care Management, Interior Design, Clothing and Textiles production as well as Food and Nutrition (Gamawa, 2015). Home Economics is made up of several subject areas which include family living, Child Development, Household and Institutional Management, Community Health, Clothing and Textiles, and Food and Nutrition. However, in Nigerian institutions of higher learning, three major aspects of Home Economics are taught in most schools.

Food and Nutrition is one of three major aspects of Home Economics taught as part of the curriculum in Tertiary Institutions. It is an area of Home Economics that aims to facilitate the empowerment of students to have a positive relationship with food (McClosky & Caraer, 2016). Operationally, it is an area of Home Economics that seeks to provide its students with the appropriate knowledge and skills on the scientific and practical aspects of food preparation, storage and/or preservation. Hence, the subject area of Food & Nutrition is geared towards provision of nutritional knowledge as well as practical skills in the production of food and beverages.

Food and Nutrition is a very diversified area of Home Economics with the aim of teaching students content rich in nutritional knowledge and developing practical skills to increase cooking self-efficacy (Lavelle, McGowan, Spence, Caraer, Raats & Hollywood, 2016). Food and Nutrition as a subject area is underpinned by a constructivist approach to teaching and learning where students are engaged in experiential learning based on learning experiences they are exposed to as contained in the curriculum. It involves imparting practical skills to students in basic baking and cooking skills, sensory perception and evaluation, cooking techniques, meal and menu planning, ingredients selection, recipe development and modification, food safety and food trends.

In developing students’ practical skills in Food and Nutrition, baking of snacks such as cakes remains one of the most taught skills in Nigerian Colleges of Education. Cake is regarded as the most popular dessert or snack regarded as being an important food in birthday parties, marriage ceremonies, anniversaries celebrations and at home. The importance attached to cakes in Nigerian events has in recent times, made cake baking a highly lucrative commercial venture. The highly lucrative nature of cake baking in Nigeria can be attributed to the fact that most ingredients used in cake baking are cheap while its preparation does not require long periods of time (Laniran & Olurankinse, 2011). In Nigerian Colleges of Education, baking of cake and its decoration form a bulk part of practicals taught in meal planning and preparation courses as stated in the curriculum of Food and Nutrition.

Curriculum, a word which was derived from the Latin word ‘currere’, which means a ‘run way’ or ‘race course’, is defined in education as the planned interaction of pupils with instructional content, materials, resources, and processes for evaluating the attainment of educational objectives (Jadhav & Patankar, 2013). It is an educational tool which is utilised to attain the total educational development of the individual through the acquisition of skills, knowledge and attitudes, all structured to broaden student’s knowledge and outlook (Akande & Tiamiyu, 2015). Simply put, curriculum refers to all the experiences of the learners for which the school accept responsibility (Sheidu, 2011 in Onyilofo, 2013). Slightly deviating from Sheidu’s view, Kranthi (2017), explains that in its broadest sense, curriculum refers to the “total learning experiences of individuals not only in school but society as well”. In analysing both authors’ view on curriculum, it is pertinent to point out that as much as curriculum is designed to suit the
individual, it is nothing but the philosophy of a society organised into different subjects, with distinct subject matter and learning experiences.

The curriculum of the educational system in a society reflects the society’s needs, goals, interests and aspirations which the society wishes to inculcate in the citizenry, this feat is attained through the subjects and subject matter (Mbah, 2015). Operationally, the curriculum refers to the wholistic combination of all the learning experiences the student is exposed to under the guidance of the teacher and other actors and authorities within a school setting. An analysis of the current discourse on curriculum will reveal that it is made of goals and objectives for both the learner specifically and the society generally. The successful impartation of societal goals, needs and aspiration into an individual lead to achievement of the goal of educating the individual, whereas, the failure of impartation of these needs and aspirations however signals failure of the goal of educating the individual.

To ascertain the degree of success or failure of the goal of educating the citizenry, assessment of learning and instructional efforts become very essential. Assessment of learning paves way to understanding the degree of student progress in learning what has been taught. At any given time, the curriculum provides lecturers with ideas and strategies for assessing student progress without which lecturers cannot be certain that they have supplied the necessary knowledge or the opportunity for the student to succeed at the next level, whether that the levels involve a high school, college or career (Jadhav & Patankar, 2013). This clearly outlines the importance of curriculum to assessment of learning and to the achievement of the learning goals and objectives.

Assessment is regarded as one of the most important activities undertaken in academic institutions. Assessment is an academic exercise undertaken to confirm that an individual has performed to the standard expected in the workplace, as expressed by the relevant competency standards of a training programme or by the learning outcomes of a vocational and technical education accredited course (Gulshan, 2016). When comprehensively undertaken, assessment involves the process of collecting data on student learning activity and using data collected in taking decisions on whether competency in the activities undertaken by the student has been achieved or not. In Food and Nutrition practical courses, assessment is categorised into process and product assessment. Product assessment is concerned with the assessment of only the final product whereas process assessment involves observing the learners and rating them on the process or procedure adopted when carrying out the practical activity. However, the present study focuses on the process assessment of cake making in Food and Nutrition.

Process skills refers to the step by step procedure taken in carrying out an academic scientific activity in which when one succeed ensures success in the world of work. Process skills makes learning easier, increase the students’ activities, increase the students’ responsibility toward learning and most especially helps in ensuring permanency in learning (Karamustafaoğlu, 2011; Aydin, 2013). In vocational education subjects such as Food and Nutrition, process skill is very important as it enables teachers identify barriers students encounter in learning, to identify better ways of teaching to solve those learning problems as well as increase students’ process skills (Ponto, 2019).

Process skill assessment in Food and Nutrition, is an activity that involves identifying the extent of competencies attained by an individual in cooking skills. Cooking skills are a set of physical or mechanical skills used in the production of a meal which encompasses cooking methods (e.g. boiling) and food preparation techniques (e.g. peeling a vegetable), as well as conceptual and perceptual skills such as understanding the transformation food undergoes when heat is applied, i.e. knowing that chicken is fully cooked from its colour (Short, 2013; Frans, 2017; Lavelle, McGowan, Hollywood, Surgenor, McCloat, Mooney,2017).

Despite the obvious importance of process skills in determining skill achievement and better product quality, much attention is not given to process skill assessment by lecturers of Home Economics in Food and Nutrition generally and Cake making specifically. As identified by Chibuzor (2014), these neglect leads to students performing poorly in academics, creativity and entrepreneurship in the course (Chibuzor, 2014). Concurring to this, Ezenwanne (2015) opined that this has caused problems in academic processes and outcomes in the subject at the tertiary education level. In seeking solutions, among all reasons for this negligence, the inadequacy of teaching and learning resources ranks high (Arubayi, 2009;
Azubuike, 2014). There is also need for the development of necessary instruments to measure the process skills of students of vocational and technical courses (Ponto, 2019). Given the researchers’ observation and empirical evidence at hand, there is need to develop an instrument for assessing student process skill and products in cake making.

Objectives of the Study

The main objective of the study was to develop an instrument for the assessment of student’s process skills in cakemaking in Abia State College of Education. Specifically, the study sought to determine the;

1. Process skills test items suitable for inclusion in the instrument for assessment of process skills in cakemaking.
2. Validity of the instrument for the assessment of process skills in cakemaking.
3. Reliability of the instrument for the assessment of process skills in cakemaking.

RESEARCH QUESTIONS

The following three research questions were formulated to guide the study;

1. What are the process skills test items suitable for inclusion in the instrument for assessment of process skills in cakemaking?
2. What is the validity of the instrument for the assessment of process skills in cakemaking?
3. What is the reliability of the instrument for the assessment of process skills in cakemaking?

METHODOLOGY

Research Design: - The study adopted instrumentation design. Instrumentation research is a type of research design whose purpose of the study is to produce a new instrument or material for educational practices (Ali, 2006). The study made use of instrumentation design because it was aimed at developing and validating a process skills instrument for assessing students’ performance in cake making in Colleges of Education.

Area of the Study: - The area of the study was Abia State. The state is located in South Eastern Nigeria. Abia state is an oil producing, industrial and economic hub of the south eastern Nigeria. The choice of the area was informed by the appreciable increase in the demand for individuals competent in cake making and to address the lack of a process skill assessment instrument in cake making in Colleges of Education, Arochukwu.

Population: - The population of the study consisted of 15 lecturers and students; 5 lecturers and 10 students in the Department of Home Economics in Abia State College of Education (Technical), Arochukwu. The lecturers aided in the identification of tasks and the skills needed to perform each task in order to generate data for the development of the cake making process skills assessment instrument.

Sample and Sampling Technique: - Due to the manageable size of the study population, the entire population were part of the study. Hence, there was no sampling.

Instrumentation: - Cake Making Process Skills Assessment Instrument (CAMPSAI) was used as instrument for data collection. The development of the instrument for assessment consisted of itemised tasks in process skill and a four – point rating scale. A careful analysis of the curriculum by the researcher showed that at the end of the instruction, the Food and Nutrition students should be able to:

1. Bake a simple plain cake
2. Identify causes and possible solutions to faults in baked cake
3. Apply simple cake decoration techniques

Considering the objectives stated above, the process skills instrument was developed to assess these objectives. The three broad objectives were transformed into operations and tasks using online resources and textbooks on cake making. In order to generate process skill items from the identified operations and tasks, task analysis was used. The generated process skill items were subjected to factor analysis to enable the researcher select those suitable for inclusion in the instrument. The process skill
items were written as statements. A four-point Likert scale was designed with response categories of Very Important (VI), Averagely Important (AI), and Slightly Important (SI) and Not Important (NI). The choice of the response categories was to enable the lecturers to carry out item by item content validation with ease.

**Validation of the Instrument:** In order to determine the importance of the items for inclusion in the final instrument, the items were subjected to factor analysis, using 0.50 in factor loading at 10% overlapping variance (Anley, Bogale & Haile – Gabriel, 2007). The resulting instrument was submitted for validation to a total of eight experts: four experts specialized were lecturers in Food and Nutrition in tertiary institution, two experts were instructors in Catering Schools/Institutes, while the remaining two were experts in measurement and evaluation in Michael Okpara University of Agriculture, Umudike. The experts were requested to assess the items to ascertain the suitability of the items and clarity of language. The experts subjected the instruments to rigorous scrutiny, considering the purpose of the study and the content of teaching cake making. The experts’ comments and suggestions were used in modifying the items.

**Data Collection and Analysis Technique:** Thirty (30) copies of the instrument were distributed to lecturers who were the study respondents. All the instruments were filled and collected. In achieving research objective 1, the identified tasks and process skill items were subjected to factor analysis, and comments of Lecturers of Food and Nutrition, Instructors in Catering Schools and experts in measurement and evaluation were used to ensure face and content validity of the skill items. In achieving research objective 2, Cronbach alpha reliability method was used to determine the reliability coefficient of the items on cake making process tasks/skills assessment instrument.

**RESULTS/FINDINGS**

**Research Question 1**

What are the process skills and products test items suitable for inclusion in the instrument for assessment of process skills in cakemaking?

**Table 1: Factor analysis on the identified cake making Process skills items to determine their suitability for inclusion in the instrument**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Practical Process Skill Items</th>
<th>Factor</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reading measuring scales at eye view to avoid error</td>
<td>0.908</td>
<td>Required</td>
</tr>
<tr>
<td>2</td>
<td>Ensuring measurement blend of flour to other ingredients</td>
<td>0.841</td>
<td>Required</td>
</tr>
<tr>
<td>3</td>
<td>Measuring dry ingredients before liquid/wet ingredients</td>
<td>0.657</td>
<td>Required</td>
</tr>
<tr>
<td>4</td>
<td>Division of batter evenly between baking pans (when multiple)</td>
<td>0.562</td>
<td>Required</td>
</tr>
<tr>
<td>5</td>
<td>Adhering strictly to baking time</td>
<td>0.878</td>
<td>Required</td>
</tr>
<tr>
<td>6</td>
<td>Adherence to measurements prescribed by recipe</td>
<td>0.552</td>
<td>Required</td>
</tr>
<tr>
<td>7</td>
<td>Use of recipes with listing in grams instead of volume</td>
<td>0.525</td>
<td>Required</td>
</tr>
<tr>
<td>8</td>
<td>Assembling all needed ingredients before starting measurement</td>
<td>0.816</td>
<td>Required</td>
</tr>
<tr>
<td>9</td>
<td>Use of graded spoons (teaspoons and tablespoons)</td>
<td>0.763</td>
<td>Required</td>
</tr>
<tr>
<td>10</td>
<td>Correct filling of measuring spoon/cups during measurement</td>
<td>0.785</td>
<td>Required</td>
</tr>
<tr>
<td>11</td>
<td>Avoidance of measuring directly into general bowl of ingredients</td>
<td>0.864</td>
<td>Required</td>
</tr>
<tr>
<td>12</td>
<td>Greasing inside of measuring cups when measuring thick liquids eg. syrup</td>
<td>0.952</td>
<td>Required</td>
</tr>
<tr>
<td>13</td>
<td>Levelling strategy adopted in cake measurement</td>
<td>0.782</td>
<td>Required</td>
</tr>
<tr>
<td>14</td>
<td>Using rubber spatula to pack down fat measurements to eliminate air pockets</td>
<td>0.789</td>
<td>Required</td>
</tr>
<tr>
<td>15</td>
<td>Use of glass measuring cups for liquids</td>
<td>0.481</td>
<td>Not Required</td>
</tr>
<tr>
<td>16</td>
<td>Use of a simple recipe</td>
<td>0.572</td>
<td>Required</td>
</tr>
<tr>
<td>17</td>
<td>Ensuring consistency of moisture as stated in the recipe</td>
<td>0.891</td>
<td>Required</td>
</tr>
<tr>
<td>18</td>
<td>Allowing ingredients to be at room temperature before addition</td>
<td>0.784</td>
<td>Required</td>
</tr>
</tbody>
</table>
19. Use of right ingredients as prescribed by recipe 0.847 Required
20. Aeration of flour 0.798 Required
21. Mixing dry and liquid ingredients differently 0.676 Required
22. Equal distribution of ingredients throughout batter 0.841 Required
23. Adding sugar in small amounts and beating to incorporate air 0.785 Required
24. Scraping the sides of the mixing bowl as needed 0.945 Required
25. Beating egg mixture until light and fluffy in texture 0.657 Required
26. Adding eggs one at a time in a separate plate to eliminate shell fragments 0.871 Required
27. Alternate between adding flour (dry) mixture and liquid mixture beating at low speed after each addition 0.535 Required
28. Adherence to mixing techniques as suggested by the recipe 0.672 Required
29. Use of fresh ingredients 0.752 Required
30. Use of unsalted butter 0.835 Required
31. Ensuring all ingredients are ready and available before starting mixing 0.984 Required
32. Economy in use of ingredients 0.875 Required

Cake Decoration
33. Allowing cake to cool completely before decoration 0.952 Required
34. Ensuring an addition of a crumb coat by spreading a layer of frosting 0.952 Required
35. Use of pastry brush in brushing of crumbs from cake 0.871 Required
36. Allowing crumb coat of frosting stand for 30mins and above to set 0.918 Required
37. Use of swirling motion in spreading frosting 0.782 Required
38. Ensuring frosting is evenly distributed on cake surface 0.892 Required
39. Achievement of desirable cake decoration 0.875 Required

Use of Baking and Mixing Tools
40. Use of clean baking and mixing tools 0.752 Required
41. Choice of appropriate size of baking pan 0.812 Required
42. Choice of appropriate colour of baking pan 0.813 Required
43. Use of appropriate measuring tools 0.725 Required
44. Ensuring that baking pans and trays are well greased or lined 0.823 Required
45. Ensuring Oven is preheated to the appropriate temperature 0.712 Required
46. Reduction of oven temp by 25°C when using dark/dull finished pans 0.852 Required
47. Using electric mixers in medium to high speed as against low speed 0.922 Required
48. Use of an offset spatula in spreading batter evenly 0.982 Required
49. Ensuring the spreading of batter to pan’s edges 0.752 Required
50. Use of pastry brush to brush off crumbs before adding frosting 0.871 Required
51. Adherence to tools suggested for usage in recipe 0.781 Required
52. Proper Utilisation of oven thermometer 0.586 Required
53. Ensure oven doors are kept closed 0.786 Required

Data in Table 1 reveal that the 53 items on cake making practical skills/tasks had their factor loading ranging from 0.481 to 0.982. All the items had greater than factor loading of 0.50 at 10% over lapping variance with three component matrix. However, item no 15 on “Use of glass measuring cups for liquids” had a lesser factor loading of 0.481. This indicated that all the cake making practical tasks satisfied the criteria for inclusion in the final copy of instrument for assessing process skills for Home Economics undergraduates in Colleges of Education except for item no 15.

Research Question 2
What is the validity of the instrument for the assessment of process skills in cakemaking?

Table 2: Validated Tasks and Process Skill Items in Cake Making

<table>
<thead>
<tr>
<th>S/N</th>
<th>Validity of the Items in Cake Making Process Skills</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Reading measuring scales at eye view to avoid error</td>
<td>Valid</td>
</tr>
</tbody>
</table>
2. Ensuring measurement blend of flour to other ingredients  
3. Measuring dry ingredients before liquid/wet ingredients  
4. Division of batter evenly between baking pans (when multiple)  
5. Adhering strictly to baking time  
6. Adherence to measurements prescribed by recipe  
7. Use of recipes with listing in grams instead of volume  
8. Assembling all needed ingredients before starting measurement  
9. Use of graded spoons (teaspoons and tablespoons)  
10. Correct filling of measuring spoon/cups during measurement  
11. Avoidance of measuring directly into general bowl of ingredients  
12. Greasing inside of measuring cups when measuring thick liquids eg. syrup  
13. Levelling strategy adopted in cake measurement  
14. Using rubber spatula to pack down fat measurements to eliminate air pockets.

**Mixing Skills**

15. Use of a simple recipe  
16. Ensuring consistency of moisture as stated in the recipe  
17. Allowing ingredients to be at room temperature before addition  
18. Use of right ingredients as prescribed by recipe  
19. Aeration of flour  
20. Mixing dry and liquid ingredients differently  
21. Equal distribution of ingredients throughout batter  
22. Adding sugar in small amounts and beating to incorporate air  
23. Scraping the sides of the mixing bowl as needed  
24. Beating egg mixture until light and fluffy in texture  
25. Adding eggs one at a time in a separate plate to eliminate shell fragments  
26. Alternate between adding flour (dry) mixture and liquid mixture beating at low speed after each addition  
27. Adherence to mixing techniques as suggested by the recipe  
28. Use of fresh ingredients  
29. Use of unsalted butter  
30. Ensuring all ingredients are ready and available before starting mixing  
31. Economy in use of ingredients  

**Cake Decoration**

32. Allowing cake to cool completely before decoration  
33. Ensuring an addition of a crumb coat by spreading a layer of frosting  
34. Use of pastry brush in brushing of crumbs from cake  
35. Allowing crumb coat of frosting stand for 30mins and above to set  
36. Use of swirling motion in spreading frosting  
37. Ensuring frosting is evenly distributed on cake surface  
38. Achievement of desirable cake decoration  

**Use of Baking and Mixing Tools**

39. Use of clean baking and mixing tools  
40. Choice of appropriate size of baking pan  
41. Choice of appropriate colour of baking pan  
42. Use of appropriate measuring tools  
43. Ensuring that baking pans and trays are well greased or lined  
44. Ensuring Oven is preheated to the appropriate temperature  
45. Reduction of oven temp by 25°C when using dark/dull finished pans  
46. Using electric mixers in medium to high speed as against low speed  
47. Use of an offset spatula in spreading batter evenly
The instrument was submitted for validation to a total of eight experts: four experts specialized in Food and Nutrition in tertiary institution, two experts were instructors in Catering Schools/Institutes, while the remaining two were experts in measurement and evaluation in Micheal Okpara University of agriculture, Umudike. The experts were requested to assess the items to ascertain the suitability of the items and clarity of language. The experts subjected the instruments to rigorous scrutiny, considering the purpose of the study and the content of teaching cake making. Table 2 shows that all the process skill test items are valid.

**Research Question 3**

What is the reliability of the instrument for the assessment of process skills in cakemaking?

**Table 3: Reliability Estimates for Items in Cake Making Process Skills Assessment Instrument**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Reliability Estimates for Items in Cake Making Process Skills Assessment Instrument</th>
<th>Crombach Alpha Coefficient</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Reading measuring scales at eye view to avoid error</td>
<td>0.83</td>
<td>High Reliability</td>
</tr>
<tr>
<td>2.</td>
<td>Ensuring measurement blend of flour to other ingredients</td>
<td>0.85</td>
<td>High Reliability</td>
</tr>
<tr>
<td>3.</td>
<td>Measuring dry ingredients before liquid/wet ingredients</td>
<td>0.72</td>
<td>High Reliability</td>
</tr>
<tr>
<td>4.</td>
<td>Division of batter evenly between baking pans (when multiple)</td>
<td>0.68</td>
<td>High Reliability</td>
</tr>
<tr>
<td>5.</td>
<td>Adhering strictly to baking time</td>
<td>0.92</td>
<td>High Reliability</td>
</tr>
<tr>
<td>6.</td>
<td>Adherence to measurements prescribed by recipe</td>
<td>0.98</td>
<td>High Reliability</td>
</tr>
<tr>
<td>7.</td>
<td>Use of recipes with listing in grams instead of volume</td>
<td>0.75</td>
<td>High Reliability</td>
</tr>
<tr>
<td>8.</td>
<td>Assembling all needed ingredients before starting measurement</td>
<td>0.87</td>
<td>High Reliability</td>
</tr>
<tr>
<td>9.</td>
<td>Use of graded spoons (teaspoons and tablespoons)</td>
<td>0.78</td>
<td>High Reliability</td>
</tr>
<tr>
<td>10.</td>
<td>Correct filling of measuring spoon/cups during measurement</td>
<td>0.62</td>
<td>High Reliability</td>
</tr>
<tr>
<td>11.</td>
<td>Avoidance of measuring directly into general bowl of ingredients</td>
<td>0.78</td>
<td>High Reliability</td>
</tr>
<tr>
<td>12.</td>
<td>Greasing inside of measuring cups when measuring thick liquids eg. syrup</td>
<td>0.78</td>
<td>High Reliability</td>
</tr>
<tr>
<td>13.</td>
<td>Levelling strategy adopted in cake measurement</td>
<td>0.81</td>
<td>High Reliability</td>
</tr>
<tr>
<td>14.</td>
<td>Using rubber spatula to pack down fat measurements to eliminate air pockets</td>
<td>0.87</td>
<td>High Reliability</td>
</tr>
<tr>
<td>Mixing Skills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Use of a simple recipe</td>
<td>0.72</td>
<td>High Reliability</td>
</tr>
<tr>
<td>16.</td>
<td>Ensuring consistency of moisture as stated in the recipe</td>
<td>0.85</td>
<td>High Reliability</td>
</tr>
<tr>
<td>17.</td>
<td>Allowing ingredients to be at room temperature before addition</td>
<td>0.91</td>
<td>High Reliability</td>
</tr>
<tr>
<td>18.</td>
<td>Use of right ingredients as prescribed by recipe</td>
<td>0.68</td>
<td>High Reliability</td>
</tr>
<tr>
<td>19.</td>
<td>Aeration of flour</td>
<td>0.70</td>
<td>High Reliability</td>
</tr>
<tr>
<td>20.</td>
<td>Mixing dry and liquid ingredients differently</td>
<td>0.88</td>
<td>High Reliability</td>
</tr>
<tr>
<td>21.</td>
<td>Equal distribution of ingredients throughout batter</td>
<td>0.89</td>
<td>High Reliability</td>
</tr>
<tr>
<td>22.</td>
<td>Adding sugar in small amounts and beating to incorporate air</td>
<td>0.87</td>
<td>High Reliability</td>
</tr>
<tr>
<td>23.</td>
<td>Scraping the sides of the mixing bowl as needed</td>
<td>0.91</td>
<td>High Reliability</td>
</tr>
<tr>
<td>24.</td>
<td>Beating egg mixture until light and fluffy in texture</td>
<td>0.78</td>
<td>High Reliability</td>
</tr>
<tr>
<td>25.</td>
<td>Adding eggs one at a time in a separate plate to eliminate shell fragments</td>
<td>0.82</td>
<td>High Reliability</td>
</tr>
<tr>
<td>26.</td>
<td>Alternate between adding flour (dry) mixture and liquid mixture beating</td>
<td>0.87</td>
<td>High Reliability</td>
</tr>
</tbody>
</table>
Analysis in Table 3 reveals that each of the 52 Cake making tasks contained in the instrument had a high reliability coefficient ranging from 0.62 – 0.89. Also, the reliability coefficient of the entire test was computed to be 0.81 which indicated that the assessment instrument was a refined test in consonance with the recommendation of Uzoagulu (2011) which stated that acceptable reliability of test used in education is generally in the range of 0.50 to 0.95. Therefore, given the high reliability coefficients for various tasks in the instrument, the third research question about the reliability of the test would be in the affirmative. Thus, the items in the instrument for assessing the practical process skills of students in cake making at Colleges of Education (Technical) Arochukwu were reliable. In order to establish the inter-rater reliability in the process skill items, a field test was conducted using 30 second year students of Home Economics and five lecturers as raters. Consequently, the inter-rater reliability for the five raters was 0.85. These values were in agreement with the recommendation by Cohen, Manion and Marrison (2011) that a coefficient ranging from 0.51 to 1.00 indicate high degree of agreement between 2 or more examiners.

Conclusion

In Home Economics, the current assessment practices with regard to cake making in curriculum of Food and Nutrition in Colleges of Education does not provide any standardized instruments for assessment. From literature reviewed, there is a dearth of valid and reliable instruments for assessing the skills acquired by students of colleges of education during practical work in cake making. This is the gap that the current research has filled. This is necessary as lack of valid and reliable instruments remains one of the major problems facing assessment and skill achievement in Home Economics. This is majorly
attributed to the fact that assessment of practical work can be vulnerable to subjectivity if not carefully carried out using valid and reliable instruments.

One another note, current assessment in Cake making involves only product assessment which assesses the end product itself to the exclusion of the process. This is erroneous as students are not observed and rated while carrying out the practical tasks, rather, they are assessed on the accuracy of the product as regarding taste, appearance, texture, as well as other organoleptic attributes, while ignoring the students’ interpretation of the recipe and other pertinent tasks undergone in cake making. Obviously, a student may by try and error or by copying a mate’s actions, arrive at the same product without necessarily understanding the process not to mention understanding different rolls of different processes. Little wonder why literature shows that many graduates of Home Economics who studied Food and Nutrition and passed their courses on meal preparation could not demonstrate the manipulative skills they are expected to possess.

To this end, the current study, designed a five-point scale instrument for assessing process skills in cake making. The study findings and the developed instrument therefore lends a voice to the great need for lecturers to carry out proper assessment in cake making involving process and product skills assessment. The study therefore provides the much-needed instrument for assessing process skills in cake making to ensure objectivity of assessment and monitoring of students’ achievement of the manipulative skills they need to succeed.

Recommendations
Based on the findings of the study, the researchers recommend that:

1. Adoption of both process and product skill assessment of students in all areas of Home Economics in Colleges of Education, Polytechnics and Universities be implemented without delay.
2. Government or Staff welfare unit of the institution should organize seminars and workshops for lecturers and teachers of Home Economics on importance of practical process assessment.
3. School Administration should make process assessment compulsory in all Vocational and Technical Education programs in general and Home Economics in particular, to encourage the use of the developed cake making practical process skills instrument for assessing students in cake making.
4. Appropriate materials and facilities that will aid the lecturer in utilising cake making practical process skills instrument, should be provided by government and/or the school administration to ensure functional education.

References

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