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To cite this article: Alfred Henry Makura & Lukanda Kalobo (2019) Reliability and equity of subject delivery competencies: Perspectives of pre-service teachers, *Journal of Psychology in Africa*, 29:5, 511-515, DOI: [10.1080/14330237.2019.1665907](https://doi.org/10.1080/14330237.2019.1665907)

To link to this article: <https://doi.org/10.1080/14330237.2019.1665907>



Published online: 06 Nov 2019.



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BRIEF REPORT

Reliability and equity of subject delivery competencies: Perspectives of pre-service teachers

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This study examined the reliability and equity of assessors of subject delivery competences as perceived by pre-service teachers. The participants were 310 final year student teachers from a college in Zimbabwe. They responded to a survey on their perceptions of assessor reliability and fairness of appraisal across the school curriculum. The assessors were college lecturers, classroom mentors, teachers-in-charge, and school heads (principals). Data were analysed using descriptive statistics, the Mann-Whitney U-test, and the Wald-Wolfowitz Runs. Results indicated a bias by assessors towards math and language lessons compared to the social and environmental science subjects. Therefore, reliability and equity were nested within assessor categories. Specifically, college lecturers were more likely to assess for subject delivery competencies in subjects for examination by the national examination council compared to school personnel/assessors.

Keywords: assessment, instructional managers, Teachers' College, teaching practice, Zimbabwe

Introduction

Teacher appraisal is the cornerstone of quality education provision (Bisschoff & Grobler, 1998; Brownell, Sindelar, Kiely, & Danielson, 2010; Hénard, 2010; Lovat & Clement, 2008; Monyatsi, Steyn, & Kamper, 2006; Popham, 2013; Wadesango, Nduna, & Kurebwa, 2013). For pre-service teachers, college instructors and school personnel are primary assessors, with the function to obtain information “that is used to make educational decisions about learners or students” (Lekalakala, Debeila, & Mokoena, 2013, p.293). Peer review is often involved, allowing student teachers to learn from each other. Baker and O’Neil (1995) are of the opinion that performance assessment is a powerful instrument of educational praxis; while Darling-Hammond, Amrein-Beardsley, Haertel, and Rothstein (2012) considered current teacher evaluation systems as characterised by unreliability. Reliability in teacher subject delivery competencies may be compromised by the heterogeneity of programmes and the pressures of curriculum inclusivity (Brownell et al., 2010) so that some school subjects may have more established assessment protocols than others. Moreover, assessors may be more comfortable assessing student teacher competencies in some subjects rather than others. This raises the issue of equity in school subject delivery performance assessment. We investigated the reliability and equity of school subject delivery competencies as perceived by pre-service teachers from their teaching practice experiences.

Reliability and equity in teacher performance appraisal

Reliability of assessment refers to its replicability or reproducibility across assessors and the object of assessment (Baume & Yorke, 2002; Hawe & Browne, 2010; Mhlolo, 2014; Yorke, 1998). Equity of assessment is about the sense of fairness; as in utility to improve *inter alia* professional development, mentoring, and

performance management (Milanowski, Heneman, & Kimball, 2009). In the context of assessment of pre-service teachers in their professional development, equity relates to whether disciplines taught are likely to have been prioritised for assessment (Gulikers, Kester, Kirschner, & Bastiaens, 2008) or whether or not assessors’ weigh essential teaching skills evenly across school subjects (Gulikers, Bastiaens, & Kirschner, 2006). The frequency of subject delivery competencies assessment is an indicator of equity and tend to increase the reliability of such assessment (Baume & Yorke, 2002; Dziwa, 2013; Jonson, 2013; Li, 1995). Studies are needed on the reliability and equity of appraisal of subject matter delivery competencies of pre-service teachers by college and school personnel. This will guide and improve the quality of teacher education programmes. Thus, teacher competence in a higher education context is a critical factor (Edelenbos & Kubanek-German, 2004; Fletcher, Meyer, Anderson, Johnston, & Rees, 2012; Mhlolo, 2014)

Context of study

The area of student teacher supervision and assessment is an essential and integral part of teacher preparation (Maphosa & Shumba, 2012). In the Zimbabwean context, student teachers are assessed internally by school-based supervisors (Instructional managers) and externally by college-based supervisors/assessors/instructors (Maphosa & Ndamba, 2012; Zireva & Makura, 2013). Both the school-based assessors and college assessors use a standardised generic assessment instrument in determining student teacher competency levels. College based assessors undertake periodic visits (at least once a school term) to the practicing schools (Nyaumwe & Mtetwa, 2006). School-based assessors make internal assessment arrangements with the concerned student teachers. Generally, a student teacher is assessed in the subject or learning area reflecting on the day’s timetable (Chimhenga, 2017;

Mashava & Chingombe, 2013). Depending factors such as available time, nature of subject and/or previously assessed subject, and the visiting supervisor may deviate from the timetable's stipulation to assess a preferred subject/area (Maphosa & Ndamba, 2012). A study by Shumba (1997) revealed assessors tended to have a bias towards supervision of Mathematics and the languages competencies, rather the social and environmental sciences subjects.

Goal of the study

This study assessed reliability and equity of subject delivery competencies as perceived by pre-service primary teacher education students attending a college in Zimbabwe (College Zim). Our study set to answer the following questions:

- To what extent is pre-service teacher performance appraisal equitable across subject disciplines?
- What is the concordance of agreement in assessment grades by assessors?

Method

Participants and setting

Participants were a convenience sample of 310 final year (pre-service) student teachers. By the time of data collection, the participants had completed five teaching practice rotation stints of four months each.

Measures

The pre-service teachers self-reported the number of assessments, subject assessment distribution, and nature of assessor (i.e. whether college or school-based assessor). A subset of the students self-reported on the frequency of assessment by the instructional managers in specific subjects only. We confirmed the reliability of self-reporting by the student teachers with data obtained from individual participants' teaching practice portfolios kept in the Teaching Practice office. We analysed mark distribution and frequency of assessment.

Procedure

Permission for the study was granted by the teacher education college. The student teachers consented their teaching records for study. We assured the students of anonymity of their data and of their right to voluntary participation without penalty. We collected the data from the students after their teaching practice assignments.

Data analysis

The data analysis focused on the reliability and equity of assessors of subject delivery competencies as perceived by pre-service teachers. Table 1 and Table 2 indicate pre-service teachers' responses regarding the frequency of assessment of students on teaching practice in 2002 and in 2012 by college and school assessors (Research question 1), and teaching practice assessment by assessors (Research question 2). We analysed the data by applying descriptive statistics for the study variables of frequency of assessment of subject delivery competencies by subject matter (see Table 1 and Table 2). Thereafter, we analysed the data by applying the Wald-Wolfowitz Runs

Test and Mann-Whitney U non-parametric tests. These tests are robust to violations of normality of distribution. We assumed both (i) coincidence of the sample and (ii) independence of observations. Independence of observations implies "...that each observation can be counted only once ..." (Pallant, 2009, p. 214). Thus, the observations may not appear in multiple categories or groups and the data referring to one subject cannot affect the data of others.

Results and discussion

Pre-service teacher performance appraisal equitable across subject disciplines

The first research question was about the extent to which pre-service teachers' performance appraisal was equitable across subject disciplines. Table 1 and Figure 1 presents the descriptive statistics for the study variables of frequency of assessment of subject delivery competencies by college and school personnel in 2002 and 2012. Mathematics was assessed the highest number of times (557), followed by English (526), Shona (432), and Environmental Science (E.S.)(267). The least assessed subject in both years was Art and Design (Art/De) (68), followed by Physical Education (P.E.) (59), and Music (52). Thus, instructional managers or assessors favoured nationally examined subjects of Mathematics, English, and Shona and the Grade 7 level of the national school curriculum.

Concordance of agreement in assessment grades by assessors

Table 2 presents the results of the analysis on the concordance of agreement in teaching practice assessment by assessors at the colleges and schools for the individual subjects. The summary analysis show that the schools scored the highest marks for Shona (75.3%), followed by Home Economics (H.E.) (73.4%), Environmental Science (73.2%), and Mathematics (72.6%).

Music was the subject that the schools scored the lowest (71.5%) on. Paradoxically, the colleges scored Music the highest (71.8%), followed by Maths (69.4%), and then Social Studies (S/S) (69.1%). The least scored subject by the college was Physical Education (56.3%) and then Art Education (62.5%). Moreover, the data from Table 2 reveal that the school-based instructional managers scored the student teachers more (72.2%) on all subjects

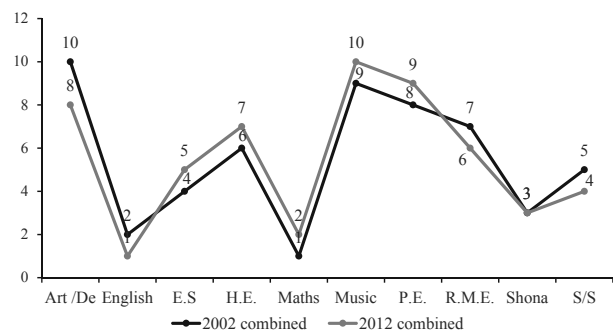


Figure 1. Pattern or trend in the ranking of frequencies of the subjects assessed at schools in 2002 and 2012 / Assessment trend in different subjects

Table 1. Frequency of assessment of students on T.P. in 2002(1) and in 2012 (2) by college ZIM and school assessors (N = 310)

Subject	College		Head/D.H		T.I.C		Mentor		College totals		Rank		School totals		Rank		Ass. per subject		Subject rank		Final rank		Subject totals					
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2		1	2			
Art/De	5	13	6	10	2	11	8	13	5	13	1.0	3.5	10	8	16	34	2.2	6.4	10	7	21	47	20.6	5.2	10	8	68	
English	183	76	96	50	16	24	30	51	183	76	21.9	20.7	3	2	142	125	19.1	23.5	2	1	325	201	12.2	22.4	2	1	526	
E.S.	70	26	66	21	25	5	31	23	70	26	8.4	7.1	5	5	122	49	16.4	9.2	3	4	192	75	5.8	8.4	4	5	267	
H.E.	42	16	28	14	11	9	10	11	42	16	5.0	4.4	6	7	49	34	6.6	6.4	6	8	91	50	23.8	5.6	6	7	141	
Maths	224	80	111	45	6	12	35	44	224	80	26.8	21.8	1	1	152	101	20.5	19	1	2	376	181	1.8	20.1	1	2	557	
Music	12	6	11	8	2	2	4	7	12	6	1.4	1.6	8	9	17	17	2.3	3.2	9	10	29	23	2.0	2.6	9	10	52	
P.E.	8	6	18	6	2	6	3	10	8	6	1.0	1.6	9	10	23	22	3.1	4.1	8	9	31	28	4.1	3.1	8	9	59	
R.M.E.	19	24	28	13	2	6	16	19	19	24	2.3	6.5	7	6	46	38	6.2	7.2	7	6	65	62	18.8	6.9	7	6	127	
Shona	193	73	71	28	19	11	14	23	193	73	23.1	19.9	2	3	104	62	14.0	11.7	4	3	297	135	9.6	15	3	3	432	
S/S	79	41	57	16	2	4	13	20	79	41	9.5	11.2	4	4	72	40	9.7	7.5	5	5	151	81	100	9	5	4	232	
AIDS Ed	-	6	-	1	-	2	-	6	-	6	-	1.6	-	11	-	9	-	1.7	-	11	-	15	-	1.7	-	11	-	-
Totals	835	367	492	212	87	92	164	227	835	367	100	100	-	-	743	531	100	100	-	-	1578	898	12.2	100	-	-	2194	

Note. Art and Design: Art/Des; Environmental Science: E/S; Home Economics: H.E.; Physical Education: P.E.; Religious and Moral Education: R.M.E.; Social Studies: S/S; AIDS Education: AIDS Ed.

than the college (66.6%). This is illustrated in the last row of Table 2.

Practical oriented subjects (Home Economics and Music in particular) tended to be scored higher than academic/theoretical subject areas, though a fewer number of students were assessed in them. Moreover, subjects with lower time allocation per week were occasionally assessed by both the school and college (including Physical Education, Art, Music, and Home Economics). An emerging trend was that student teachers who were assessed in subjects such as Physical Education and Art Education scored low (see subject average in Table 2).

Addressing issues of reliability and equity in the provision of quality teacher education using pre-service teacher performance appraisal.

We tested for differences in assessor reliability and equity across the curriculum on the critical value (r_c) at a 5% level of significance and the test statistics r (Z-score) were 0.000. From this analysis, we noted that the college assessed students on more occasions than school-based supervisors and with a preference for Mathematics, English, Shona, and Social Studies.

Data collected for the study pointed at consistency regarding outcomes of the performance appraisal (assessment) activities. There was a similar pattern regarding assessment equity in the various subject areas by the respective instructional managers. A biased student teacher appraisal trend towards examinable subjects was noted. Table 1 and Table 2 are illustrative of this.

Our findings are in accordance with that of Shumba, Voss, and Zilg (1997) who reported a bias towards assessment of competencies in mathematics and the languages. Regarding equity, we observed a lack of equity in that assessors prioritised subjects that are examined for school progress by the National Examinations' Council (see also Gulikers et al., 2006; Masendeke, 1997; Shumba, 2000). As a collective, the marginalised subject areas seemed to generally suffer from a "twin evil": That of low assessment frequencies and low performance appraisal (assessment) scores. Hence the call by Godwin (1997), to assess for equity and inclusion in the education provision.

Implications for teacher education quality improvement

Findings from this study suggest the need for college and school-based instructional managers or assessors to subjects such as Art Education, Physical Education, Music, Home Economics, and Religious and Moral Education equitable to other school subjects. This may involve revisiting the teaching practice assessment policy on student teacher assessment and supervision particularly on issues of parity and equity. School-based instructional managers or assessors should be encouraged to visit students on more occasions than college instructional managers or supervisors since they are in daily interaction with the student teachers. The management of the instructional process is a key role of school heads (principals). Current practices seem to suggest school managers are not adequately appraising student teachers on teaching practice. To address this need, colleges should

Table 2. Teaching practice assessment by assessors: Average per subject (%) ($N = 310$)

Subject	College AVR	Mentor	T.I.C.	Head/Dep.	School AVR	Subject AVR
Art /De	62.5	69.7	69.1	69.5	69.4	67.7
English	67.0	71.7	72.1	71.7	71.8	70.6
E.Sc	66.4	73.8	73.2	72.6	73.2	71.5
H.E	66.8	74	73.7	72.6	73.4	71.8
Maths	69.4	73.7	70.7	73.5	72.6	71.8
Music	71.8	72.1	73.5	68.8	71.5	71.6
P.E	56.3	67.1	73.3	74	71.5	67.7
RME	67.8	71.4	69.8	69.4	70.2	69.6
Shona	66.5	75.8	75.4	74.8	75.3	73.1
S/S	69.1	73	69.3	71.2	71.2	70.6
Total average	66.6%	72.4%	72%	72.7%	72.2%	71%

provide assessment seminars and workshops to schools on equity and reliability in student teacher performance appraisal. Moreover, school personnel require ongoing education on assessment/supervision trends and practices aimed at improving equity and reliability aspects of teacher performance appraisal.

Conclusion

Our study reveals that the pre-service teacher performance appraisal was not equitable across subject disciplines. There was an apparent bias towards “examinable subjects” and subjects with more teaching time allocation per week. With regards to the concordance of agreement in assessment grades by assessors, the study revealed comparable pre-service teacher performance appraisal practices between college and school-based assessors. However, school managers could be more engaged in the supervision of pre-service teachers than was the case in this study.

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