Explanatory Factors for Supervision Effectiveness of Senior Secondary School Heads of Agriculture Departments in Botswana

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Abstract
A descriptive correlational research was designed to identify factors perceived to explain supervision effectiveness of senior secondary school heads of agriculture department in Botswana. A valid and reliable instrument was used to collect data. Findings revealed that, heads of agriculture department were effective in their supervisory roles. Variables that explained supervision effectiveness were adequacy of supervision time, interpersonal qualities possessed, work experience, amount of time spent in other engagements, and amount of time spent teaching. The conclusions drawn from findings of the study were that, adequate time of supervision is important for heads of agriculture department to perform their supervisory roles effectively, and heads of agriculture department value supervision, and therefore, need little supervision from school heads to perform their supervisory roles. The teaching service management in Botswana should consider reducing teaching time for heads of agriculture department to afford heads of agriculture department more time to focus on supervision tasks.

Keywords: Adequacy of Time, Heads of Agriculture Department, Supervision Effectiveness, Supervisory Roles

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Introduction and Conceptual Framework

Supervision is viewed as the phase of administration, which focuses primarily upon the achievement of the appropriate instructional expectations of educational systems and is concerned with efficient and proper management of personnel (Eye, Netzer, & Krey, 1971). Drysdale and Mulford (2005) further described supervision as the ability to effectively guide and evaluate the job performance of the workers. Botswana senior secondary schools face challenges in effective supervision due to increase in number of students and teachers. In the early development of formal education, school heads could manage schools with ease. However, the drastic increase in number of students and teachers in recent years stretched the school head management capabilities. Thus, the Ministry of Education in Botswana decided to overhaul the leadership structure in schools. The purpose was to improve supervision effectiveness, by introducing position of head of department to oversee different groups of subjects in schools (Ministry of Education, 1994).

The heads of agriculture department are expected to co-ordinate work of the department, and organize in-service training for teachers. There are also to guide and counsel teachers, organize mock examinations, evaluate teacher performance, keep records, ensure time management in the department, and conduct departmental meetings (Teaching Service Management Guidelines, 2000).

Several studies have examined duties of supervisors in schools and the need for effective supervision. Koko (1998) found that effective supervision is measured by the ability to effectively prepare and train staff on the job. Staff development should be the concern of supervisors, to keep teachers abreast with the latest technologies. Keregero and Mthupha (1997) concluded that supervisors should motivate staff, recognize the success of teachers, and provide positive reinforcement. Thus, supervisors should understand the principles of motivation and use them accordingly.

Marland (1971) reported that supervisors should provide teachers with finances, books, equipment to ensure student effective learning. Myeni (2000) reported that, failure to supervise could lead to decline in teachers’ commitment, morale and productivity, and quality of student academic performance. Walker and Kitchel (2004) found that teachers were leaving the teaching profession, and this was related to job dissatisfaction and lack of support from supervisors.

Nkambule (1998) and Myeni (2000) found that supervision of the schools agriculture program in Swaziland was inadequate. Supervisors were inefficient in evaluating performance of teachers and did not provide feedback on their observations. In Ohio, Lindner (2001) found that supervisors were deficient in motivating employees, analyzing job performance of employees, appraising staff, counseling staff, and providing guidance to staff on how to plan. While in Zimbabwe, Chivore (1994) concluded that, both school heads and education officers were ineffective in discharging their supervisory roles. Nkambule also found that, supervisors lacked adequate time to discharge their supervisory roles. Malambe (2003) and Raunikar (1986) reported that supervisors had many responsibilities, which diminish their supervision effectiveness.

Campbell, Corbally, and Nystrand (1982) found that, time was a major constraint for administrators to perform their duties and suggested that supervisors should keep a log and keep track on their use of time and delegate some tasks to staff members. The literature suggests that supervisors need adequate time to be effective in their supervisory roles.

Interpersonal qualities of supervisors were also found to have a major influence in supervision effectiveness. Roberts (2006), Dlamini (1988), and Spector (1996) concluded that effective supervisors should be reliable,
resourceful, honest, patient, flexible, approachable, dependable, and innovative, and should possess ability to communicate. Roberts (2006) recommended that personal characteristics should be used as one of the basis for selecting cooperating teachers, who also perform supervisory work.

Dlamini (2004) found that the supervisory roles of heads of department “were positively associated with number of years in teaching, age, and number of years as head of department, number of teaching staff supervised, and length of service” (p. 51), prior to being in a supervisory role. Magagula (1993) found that teacher qualification and location of school had a significant influence on teacher commitment at work.

However, Nkambule (1998) found no significant differences between supervisors in urban and rural schools; and place where teacher was trained. McCracken, Smith, and Saundi (1984), Islam (1971), and Pajak and Blasé (1989) reported a high level of commitment among married agents than single agents. Nkambule (1998) found that years of teaching experience was a predictor of effective supervision. However, Obilade (1992) reported that, no significant difference was found between experienced supervisors and less experienced supervisors.

The conclusion drawn from the review of literature was that background and demographic variables data explaining supervision effectiveness were inconsistent. Thus, the need to explore more and assess the influence of background and demographic variables on supervision effectiveness by heads of agriculture department in Botswana. The review of literature on the main revealed only that supervisors were ineffective in conducting their supervisory roles.

The heads of agriculture department as professional leaders play a key role to superior performance of students in agriculture, and to the overall quality of the agriculture program in a school. However, the observation has been that the school administrators still attend to issues of students and teachers’ misconduct, which could be addressed by the heads of agriculture department. The heads of agriculture department have also been criticized for not conducting lesson observations and not organizing in-service training for teachers, and teachers have complained of lack of support from heads of department.

Since the inception of the heads of agriculture department position in the education system in Botswana senior secondary schools, no study has been conducted to determine explanatory variables for level of supervision effectiveness by heads of agriculture department in Botswana senior secondary schools, and thus, this study was designed and conducted.

**Purpose and Objectives**

The purpose of the study was to determine factors perceived to influence supervision effectiveness of senior secondary school heads of agriculture department in Botswana. The specific objectives of the study were to:

1. Describe the level of supervision effectiveness by heads of agriculture department;
2. Describe the adequacy of supervision time by heads of agriculture department;
3. Describe interpersonal qualities possessed by heads of agriculture department;
4. Describe the relationship between level of supervision effectiveness and independent variables; and
5. Identify explanatory variables for supervision effectiveness by heads of agriculture department.

**Research Hypothesis**

The research was based on the hypothesis that perceived increase in supervision time should explain more
variance on perceived supervision effectiveness by heads of agriculture department. Major, rival independent variables and the dependent variable are diagrammatically shown in Figure 1.

**Methodology**

The design of the study was *ex post facto*. Figure 1 shows the conceptual framework for the study. The target population of the study was all the heads of agriculture department (*N* = 27), all agriculture senior teachers (*N* = 27), and all deputy school heads (*N* = 27). The study was a census and sampling error was not a threat to external validity of the study. Frame error was controlled by obtaining up-to-date lists of all groups of respondents from the Ministry of Education. The lists were then purged, to avoid duplication of names, thus, controlling for selection error.

<table>
<thead>
<tr>
<th>Major independent variable (MIV):</th>
<th>Dependent variable (DV): Perceived supervision effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived adequacy of supervision time</td>
<td>Rival independent variables (AIV): Interpersonal qualities, sex, age, highest educational level, college where highest level of education was awarded, took a supervision course at college/university, took a management course at college/university, took administration course at college/university, salary level, location of school, distance of residential home from school, marital status, number of years in teaching, work experience prior to current position, number of years in current position, mother in supervisory position, father in supervisory position, number of teachers supervised, number of support staff supervised, number of students enrolled in agriculture, number of teaching periods, length of teaching periods, amount of time spent planning for teaching, amount of time spent teaching, amount of time spent marking, amount of time spent supervising, amount of time spent in department meetings, amount of time spent in meetings with school head, amount of time spent in other engagements, number of committees served within the school, and number of committees served outside school.</td>
</tr>
</tbody>
</table>

![Figure 1. Conceptual framework of the study.](image)

A questionnaire was used to collect data, following suggestions by Dillman (1978). The questionnaire was divided into four parts. Part I assessed perceptions regarding the dependent variable, supervision effectiveness. Respondents were asked to indicate the level of supervision effectiveness by their head of agriculture department in performing their supervisory roles. The supervisory roles comprised 36 items grouped into ten clusters, namely, planning, communicating, evaluating teacher performance, motivating staff, organizing in-service training for teachers, record keeping, conducting meetings, directing work within the department, showing support to teachers, and time management. A six-point, summed rating scale was used to determine level of supervision effectiveness. The rating scale ranged from 1 (*very ineffective*), 2 (*ineffective*), 3 (*slightly ineffective*), 4 (*slightly effective*), 5 (*effective*), to 6 (*very effective*).

Part II contained items relating to the major independent variable, perceived adequacy of supervision time. Respondents were requested to indicate their perceived adequacy of supervision time by their head of agriculture department on 34 supervisory roles performed by heads of agriculture department. The supervisory roles were then grouped into nine clusters, namely, planning, communicating, evaluating teacher performance, motivating staff, organizing in-service training for teachers, record keeping, conducting meetings, and directing work in the department, and
showing support for teachers. Perceived adequacy of supervision time was measured using a six-point, summed rating scale. The rating scale ranged from 1 (very inadequate), 2 (inadequate), 3 (slightly inadequate), 4 (slightly adequate), 5 (adequate), to 6 (very adequate).

Part III listed interpersonal qualities. Respondents were asked to indicate their level of agreement of the interpersonal qualities possessed by their head of agriculture department. A six-point, summed rating scale was used. The rating scale ranged from 1 (strongly disagree), 2 (disagree), 3 (slightly disagree), 4 (slightly agree), 5 (agree), to 6 (strongly agree).

Part IV consisted of the remaining rival independent variables, and the respondents were asked to fill or tick (√) their background and demographic variables. The researchers established the face validity of the instrument and a panel of experts, consisting of three headmasters from Botswana senior secondary schools, two agricultural principal education officers; and, two lecturers in the department of Agricultural Education and Extension from the University of Swaziland reviewed and attested to the content validity of the instrument. A pilot test consisting of 30 teachers was conducted with teachers of home economics, art, design and technology, from Botswana senior secondary schools, and agriculture teachers from junior secondary schools not participating in the study. Cronbach’s alpha reliability coefficients for the domains were computed from the pilot test data, and coefficients ranged from .42 and .95. However, post-hoc reliability coefficients ranged from .72 to .97.

Prior to data collection, a research permit was sought and obtained from the Ministry of education to conduct the research in schools. Letters were then written to respondents to inform them of the research study, the purpose and objectives of the study, and the schedule for events, with specific dates for data collection. A self-administered questionnaire procedure was followed and used for data collection. The researchers hand-delivered questionnaires to the respondents. Each respondent was given a week to respond, after which, the researchers collected the filled questionnaire. Key holders were used as incentives. Miller and Smith (1983) suggestions were followed to control for non-response error. A 100% response rate was attained after a total of three visits to non-respondents.

The Statistical Package for Social Sciences (SPSS) version 10.0 for windows was used to compute data. Data were presented using descriptive statistics, correlations and multiple regressions. Descriptive statistics were used to describe background and demographic variables of respondents, the level of supervision effectiveness, and adequacy of supervision time. Correlations were used to describe relationships between the dependent variable, supervision effectiveness and the independent variables. Stepwise multiple regression analysis procedure was used to identify variables that explained and predicted supervision effectiveness.

Findings

About 72% of the respondents were males, and 63% were married. The mean age was 43 years ($SD = 5.86$) and 83% held the bachelor’s degree, with 54% trained within the country. About 59% of the respondents took a course in supervision, 70% reported to have taken a course on management, and 67% took a course in administration. The salary level of the respondents ranged between US$21 410 and US$23 638 per annum. A small number of the respondents or 6% and 11%, had mothers and father, respectively, in supervisory positions. About 70% of the respondents were teaching in rural schools. On average, respondents stayed about 5 km ($SD = 17.60$) away from school. On average, respondents had 19 years ($SD = 5.23$) teaching experience, had work experience of
11 years (SD = 3.94) prior to current position, and have been in current position for 6 years (SD = 4.57). Respondents had 14 teaching periods (SD = 7.13) of 35 minutes (SD = 9.55) long. Each head of department supervised on average 28 teachers and 4 support staff. The average number of students enrolled for agriculture classes for the 2006 calendar year was 875 per school. Respondents on average served in four committees within the school and two committees out of school. Heads of agriculture department in Botswana are experienced workers.

The first objective of the study was to describe level of supervision effectiveness by heads of agriculture department in Botswana senior secondary schools. Findings contained in Table 1 indicate that, respondents agreed that heads of agriculture department were effective in discharging their supervisory roles with an overall mean of 4.68 (SD = .88). The supervisory role cluster that received the highest mean rating was communicating (M = 4.92, SD = .94). Organizing in-service training for teachers was rated lowest (M = 4.14, SD = 1.32). The heads of department tended to rate the supervisory roles higher than the deputy school heads or the agriculture senior teachers.

Table 1

<table>
<thead>
<tr>
<th>Supervisory roles</th>
<th>Deputy School Heads (n = 27)</th>
<th>Heads of agriculture Department (n = 27)</th>
<th>Agriculture Senior Teachers (n = 27)</th>
<th>Total (N = 81)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Communicating</td>
<td>4.90</td>
<td>.89</td>
<td>5.21</td>
<td>.63</td>
</tr>
<tr>
<td>Directing</td>
<td>4.88</td>
<td>.89</td>
<td>5.05</td>
<td>.54</td>
</tr>
<tr>
<td>Time management</td>
<td>4.85</td>
<td>1.09</td>
<td>5.02</td>
<td>.69</td>
</tr>
<tr>
<td>Motivating teachers</td>
<td>4.96</td>
<td>.78</td>
<td>4.86</td>
<td>.83</td>
</tr>
<tr>
<td>Conducting meetings</td>
<td>5.00</td>
<td>.87</td>
<td>4.94</td>
<td>1.14</td>
</tr>
<tr>
<td>Planning</td>
<td>4.90</td>
<td>.80</td>
<td>4.96</td>
<td>.75</td>
</tr>
<tr>
<td>Evaluating teachers</td>
<td>4.76</td>
<td>.88</td>
<td>4.87</td>
<td>.65</td>
</tr>
<tr>
<td>Supporting teachers</td>
<td>4.70</td>
<td>.96</td>
<td>4.93</td>
<td>.79</td>
</tr>
<tr>
<td>Record keeping</td>
<td>4.73</td>
<td>1.09</td>
<td>4.64</td>
<td>.94</td>
</tr>
<tr>
<td>Organizing in-service training</td>
<td>4.55</td>
<td>1.12</td>
<td>4.34</td>
<td>1.08</td>
</tr>
<tr>
<td>Total</td>
<td>4.82</td>
<td>.73</td>
<td>4.88</td>
<td>.56</td>
</tr>
</tbody>
</table>

Note. Rating scale: 1 = very ineffective, 2 = ineffective, 3 = slightly ineffective, 4 = slightly effective, 5 = effective, 6 = very effective).

The second objective of the study was to describe perceived level of adequacy of supervision time by heads of agriculture department. Findings presented in Table 2 reveal that, overall, respondents held the perception that the heads of department had adequate time to perform their supervisory roles (M = 4.36, SD = 1.00). Conducting meetings received the highest mean rating (M = 4.84, SD = .99) followed by motivating teachers (M = 4.64, SD = 1.12), directing (M = 4.62, SD = 1.05) and communicating (M = 4.56, SD = 1.08). Organizing in-service
training for teachers received the lowest mean rating ($M = 3.83, SD = 1.35$).

Table 2

**Perceived Adequacy of Supervision Time by Heads of Agriculture Department**

<table>
<thead>
<tr>
<th>Supervisory roles</th>
<th>Deputy School Heads (n = 27)</th>
<th>Heads of Agriculture Department (n = 27)</th>
<th>Agriculture Senior Teachers (n = 27)</th>
<th>Total (N = 81)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Conducting meetings</td>
<td>5.13</td>
<td>.82</td>
<td>4.67</td>
<td>1.02</td>
</tr>
<tr>
<td>Motivating teachers</td>
<td>4.85</td>
<td>1.22</td>
<td>4.65</td>
<td>.90</td>
</tr>
<tr>
<td>Directing</td>
<td>4.73</td>
<td>.91</td>
<td>4.53</td>
<td>1.03</td>
</tr>
<tr>
<td>Communicating</td>
<td>4.65</td>
<td>1.15</td>
<td>4.69</td>
<td>.77</td>
</tr>
<tr>
<td>Record keeping</td>
<td>4.60</td>
<td>1.02</td>
<td>4.27</td>
<td>1.08</td>
</tr>
<tr>
<td>Supporting teachers</td>
<td>4.35</td>
<td>1.13</td>
<td>4.30</td>
<td>1.30</td>
</tr>
<tr>
<td>Evaluating teachers</td>
<td>4.30</td>
<td>1.16</td>
<td>4.24</td>
<td>1.02</td>
</tr>
<tr>
<td>Planning</td>
<td>4.38</td>
<td>1.14</td>
<td>4.21</td>
<td>.99</td>
</tr>
<tr>
<td>Organizing in-service training for teachers</td>
<td>4.39</td>
<td>1.16</td>
<td>3.90</td>
<td>1.26</td>
</tr>
<tr>
<td>Total</td>
<td>4.55</td>
<td>.95</td>
<td>4.35</td>
<td>.91</td>
</tr>
</tbody>
</table>

*Note.* Rating scale: 1 = very inadequate, 2 = inadequate, 3 = slightly inadequate, 4 = slightly adequate, 5 = adequate, 6 = very adequate.

The third objective of the study was to describe interpersonal qualities possessed by heads of agriculture department. Findings in Table 3 indicate that respondents agreed that heads of department in Botswana possessed the interpersonal qualities for effective supervision. Approachability received the highest mean rating ($M = 5.28$, $SD = .88$), and being a good listener ($M = 5.17$, $SD = .93$). The overall mean rating of the interpersonal qualities by the three group of respondents was 4.99 ($SD = .79$).

The fourth objective of the study was to describe the relationship between perceived level of supervision effectiveness and independent variables. Correlations were used to describe the relationship between perceived supervision effectiveness and independent variables. Correlation descriptors developed by Davis (1971) were used to describe the strength of the associations. Pearson product moment ($r$) was used to measure the degree of associations for interval by interval variables, point biserial ($r_{pb}$) correlation coefficients were used for dichotomous by interval variables, and spearman rank order ($r_s$) was used for interval by ordinal variables. Table 4 shows the correlation coefficients between independent variables and supervision effectiveness.
The findings indicate that, a very strong association ($r = .72$) existed between supervision effectiveness and adequacy of supervision time. Adequate supervision time tended to increase positively with perceived level of supervision effectiveness. Also, the findings indicate a positive substantial association between interpersonal qualities possessed by heads of agriculture department and supervision effectiveness ($r = .63$). Work experience prior to current position and amount of time spent performing a supervisory function, had a moderate association, $r = .32$ and $r = .30$, respectively, with supervision effectiveness. Other variables had low to negligible association with supervision effectiveness.

The fifth objective of the study was to identify explanatory variables for supervision effectiveness, the dependent variable. The analysis procedure used was multiple regression. Data from all respondents were included in the analysis. However, prior to conducting multiple regression the existence of multicollinearity among independent variables needed to be checked. Intercorrelations among independent variables were therefore, computed to determine the existence of multicollinearity.

Multicollinearity exists when there is a very strong association ($r = .80$ or above) between independent variables. High correlations are expected between a dependent variable and independent variables. Highly correlated independent variables are redundant, thus, measuring the same thing. Collinearity can lead to instability in the regression estimates, with changes in the data leading to large changes.
in the regression coefficients. Chatterjee, Hancock, and Simonoff (1995) explained that, the significance of individual variables is often understated in the presence of collinearity, due to inflation of the estimated standard errors and their associated estimated coefficients.

Table 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation Coefficients and Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequacy of supervision time (int.)</td>
<td><strong>.72r</strong> Positive and Very strong</td>
</tr>
<tr>
<td>Interpersonal qualities (int.)</td>
<td><strong>.63r</strong> Positive and Substantial</td>
</tr>
<tr>
<td>Sex (nom., 0 = female, 1 = male)</td>
<td><strong>.14_{pb}</strong> Positive and Low</td>
</tr>
<tr>
<td>Age-----years (int.)</td>
<td><strong>.09r</strong> Positive and Low</td>
</tr>
<tr>
<td>Highest level of education (ord.)</td>
<td><strong>-.06r_{s}</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Took supervision course at college/university (nom., 0 = no, 1 = yes)</td>
<td><strong>.14_{pb}</strong> Positive and Low</td>
</tr>
<tr>
<td>Took management course at college/university (nom., 0 = no, 1 = yes)</td>
<td><strong>.02_{pb}</strong> Positive and Negligible</td>
</tr>
<tr>
<td>Took administration course at college/university (nom., 0 = no, 1 = yes)</td>
<td><strong>.14_{pb}</strong> Positive and Low</td>
</tr>
<tr>
<td>Salary level (ordinal)</td>
<td><strong>-.07r_{s}</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Location of school (nom., 0 = rural, 1 = urban)</td>
<td><strong>-.01r_{pb}</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Distance of residential place from school (int.)</td>
<td><strong>.13r</strong> Positive and Low</td>
</tr>
<tr>
<td>Marital status (nom., 0 = single, 1 = married)</td>
<td><strong>.16r_{pb}</strong> Positive and Low</td>
</tr>
<tr>
<td>Number of years in teaching (int.)</td>
<td><strong>.03r</strong> Positive and Negligible</td>
</tr>
<tr>
<td>Work experience prior to current position (int.)</td>
<td><strong>.32r</strong> Positive and Moderate</td>
</tr>
<tr>
<td>Number of years in current position (int.)</td>
<td><strong>-.24r</strong> Negative and Low</td>
</tr>
<tr>
<td>Mother in supervisory position (nom., 0 = no, 1 = yes)</td>
<td><strong>-.05_{pb}</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Father in supervisory position (nom., 0 = no, 1 = yes)</td>
<td><strong>-.03_{pb}</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Number of teachers supervised (int.)</td>
<td><strong>.17r</strong> Positive and Low</td>
</tr>
<tr>
<td>Number of support of staff supervised (int.)</td>
<td><strong>.16r</strong> Positive and Low</td>
</tr>
<tr>
<td>Number of students enrolled in agriculture (int.)</td>
<td><strong>.04r</strong> Positive and Negligible</td>
</tr>
<tr>
<td>Number of teaching periods (int.)</td>
<td><strong>-.02r</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Length of teaching periods (int.)</td>
<td><strong>.12r</strong> Positive and Low</td>
</tr>
<tr>
<td>Amount of time spent planning for teaching (int.)</td>
<td><strong>-.06r</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Amount of time spent teaching (int.)</td>
<td><strong>-.06r</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Amount time spent marking (int.)</td>
<td><strong>-.02r</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Amount time spent supervising (int.)</td>
<td><strong>.30r</strong> Positive and Moderate</td>
</tr>
<tr>
<td>Amount of time spent in department meetings (int.)</td>
<td><strong>.21r</strong> Positive and Low</td>
</tr>
<tr>
<td>Amount of time spent in meetings with school head (int.)</td>
<td><strong>-.05r</strong> Negative and Negligible</td>
</tr>
<tr>
<td>Amount of time spent in other engagements (int.)</td>
<td><strong>-.28r</strong> Negative and Low</td>
</tr>
<tr>
<td>Number of committees served in school (int.)</td>
<td><strong>.14r</strong> Positive and Low</td>
</tr>
<tr>
<td>Number of committees served outside school (int.)</td>
<td><strong>-.04r</strong> Negative and Negligible</td>
</tr>
</tbody>
</table>

*Note. r = Pearson product-moment correlation coefficient; r_s = Spearman rank order coefficient; and r_{pb} = Point biserial correlation. Variable types included: int. = Interval; ord. = Ordinal; and nom. = Nominal.*
Dlamini, Ngwenya, and Dlamini (2005) suggested that if multicollinearity exists, the related independent variables could be combined into one variable or the unimportant variable could be dropped. The combined variables should have the same units.

Findings of this study indicated existence of multicollinearity between age and number of years in teaching ($r = .91$), number of support staff supervised, and number of teachers supervised ($r = .91$). Other independent variables had low degree of multicollinearity. The related variables, which were highly correlated in this study, had the same units, as such; the variables were then combined prior to running regression analysis.

The stepwise regression analysis was used to determine independent variables that explained variance and predicted variance on supervision effectiveness by heads of agriculture department. Table 5 contains five explanatory variables for supervision effectiveness by heads of agriculture department. The variables explained 65% of the cumulative variance. Perceived adequacy of supervision time, the major independent variable, explained the greatest variance (52%). Interpersonal qualities of heads of agriculture department accounted for 6% of the variance in supervision effectiveness. Length of teaching experience prior to current position explained 3%; and amount of time spent in other engagements explained 2% of variance in supervision effectiveness.

Table 5 contains five explanatory variables for supervision effectiveness by heads of agriculture department. The variables explained 65% of the cumulative variance. Perceived adequacy of supervision time, the major independent variable, explained the greatest variance (52%). Interpersonal qualities of heads of agriculture department accounted for 6% of the variance in supervision effectiveness. Length of teaching experience prior to current position explained 3%; and amount of time spent in other engagements explained 2% of variance in supervision effectiveness.

Amount of time spent in other engagements revealed a negative regression coefficient of -.03. The negative regression coefficient implies that as amount of time spent in other engagement increased, supervision effectiveness reduced by a score of .03. The amount of time-spent teaching explained 2% of the variance in supervision effectiveness and also indicated a negative regression coefficient. The results revealed that as time spent in teaching increased, supervision effectiveness reduced by a score of .02 ($B = -.02$). Since adequacy of supervision time is the main variable that influenced supervision effectiveness of heads of agriculture department, the hypothesis that perceived increase in supervision time explains more variance on perceived supervision effectiveness by heads of agriculture department, was, thus, accepted.
Table 5

Variables Perceived to Explain and Predict Supervision Effectiveness by Heads of Department

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>R</th>
<th>R²</th>
<th>R² change</th>
<th>B</th>
<th>β</th>
<th>t-value</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived adequacy of supervision time</td>
<td>.72</td>
<td>.52</td>
<td>.52</td>
<td>.45</td>
<td>.50</td>
<td>5.87</td>
<td>.01</td>
</tr>
<tr>
<td>Interpersonal qualities possessed by heads of department</td>
<td>.76</td>
<td>.58</td>
<td>.06</td>
<td>.31</td>
<td>.28</td>
<td>3.22</td>
<td>.00</td>
</tr>
<tr>
<td>Work experience as teacher prior to current position</td>
<td>.78</td>
<td>.61</td>
<td>.03</td>
<td>.03</td>
<td>.15</td>
<td>2.08</td>
<td>.04</td>
</tr>
<tr>
<td>Amount of time spent in other engagements</td>
<td>.80</td>
<td>.64</td>
<td>.02</td>
<td>-.03</td>
<td>-.21</td>
<td>-2.87</td>
<td>.01</td>
</tr>
<tr>
<td>Amount of time spent teaching</td>
<td>.81</td>
<td>.65</td>
<td>.02</td>
<td>-.02</td>
<td>-.15</td>
<td>-2.12</td>
<td>.04</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td>1.21</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Note:* Adjusted $R^2 = .64$, $SE = .44$.

Conclusions, Implications and Recommendations

Botswana senior secondary school heads of agriculture department were perceived to be effective and had adequate time in performing their supervisory roles. It appears heads of agriculture department devote their time in performing their supervisory roles, and thus, the perceived level of their effectiveness. Also, findings revealed that supervisors with the ability to communicate, motivated teachers, and were flexible, dependable, honest, approachable and patient and were likely to be effective in performing their supervisory roles. Schools need supervisors who can relate well with teachers and assist in solving teachers problems. The findings are consistent with a study by Dlamini (1988) who concluded that effective supervisors should be sociable, hard working, honest, patient, dependable, and should be able to communicate. The Teaching Service Management in the Ministry of Education of Botswana should consider the interpersonal qualities of teachers in selecting and promoting teachers to the position of head of department.

The findings on the associations between the independent variables and the dependent variable suggest that, for supervisors to effectively perform their supervisory roles, adequate time should be provided for planning, organizing in-service training for teachers, evaluating teachers’ performance, motivating teachers, and giving support to teachers. Nkambule (1998) also found that adequacy of supervision time explained and predicted supervision effectiveness of agriculture coordinators in Swaziland, and those agriculture coordinators needed adequate time to perform their supervisory roles. Other variables that explained and predicted supervision effectiveness were interpersonal qualities of heads of agriculture department, work experience prior to promotion to current position, amount of time spent in other engagements, and amount of time spent teaching.

The findings that work experience prior to current position increased with supervision effectiveness of heads of agriculture department suggest that teachers should be allowed to gain professional experience in their area of expertise before given the headship position as experience is a perquisite to such a responsibility. A study by Nkambule (1998) also found that teaching experience explained supervision effectiveness by agriculture coordinators in Swaziland. The findings of the current study also revealed that as more time was spent in other engagements, supervision effectiveness decreased. The finding was consistent with a study by Raundikar (1986), who concluded that many responsibilities diminish the effectiveness of supervisors. Malambe (2003) also found that inspectors in Botswana were hampered from performing their roles due to many
responsibilities. Amount of time spent teaching indicated a negative regression coefficient, and the implication was that, teaching load of heads of department was high and thus, reducing supervision effectiveness.

Though the respondents agreed that the heads of department had adequate supervision time, a need is apparent for school heads to require heads of agriculture department to keep daily log of their activities for their supervisory roles, to monitor the use of time, ensuring that effective supervision does not erode. Since as more time spent in teaching is negatively related to supervision effectiveness, the Teaching Service Management in the Ministry of Education in Botswana should consider reducing the teaching time required of heads of agriculture department, so that heads of agriculture department can concentrate on supervision, and thus, improve their effectiveness.

The school heads should also collaborate with the Teaching Service Management in providing an in-service training programme on supervision. In-service training programme should target both newly recruited heads of agriculture department and those already in the service. The school libraries should provide materials, such as books, journals, and audio-tapes and video-tapes on supervision, for heads of agriculture department to enrich their supervisory skills.

Time spent in other engagements and time spent in committees outside the school was negatively correlated with supervision effectiveness. The heads of agriculture department should reduce additional responsibilities performed outside the school, so that more time can be available to plan, conduct meetings, evaluate teacher performance, organize workshop for teachers, and to keep teachers up-to-date with latest technology development in agriculture and to manage departmental business.

The study on supervision effectiveness was conducted in senior secondary schools; therefore, a similar study could be conducted in Botswana junior secondary schools. Such a study could provide the Ministry of Education with valuable information on the performance of heads of department in junior secondary schools. The findings could also serve as a basis for designing strategies that should improve supervision in junior secondary schools. This study focused on heads of department supervising agriculture teachers in senior secondary schools; a similar study could be conducted that encompass all heads of department in Botswana senior secondary schools. The study could focus on a more diverse group, hence; provide a complete inventory of effective supervision in Botswana senior secondary schools.

The conclusions of this study were based on perceptions of respondents. Thus, a case study based on observations need to be conducted to document the apportioning of time by heads of agriculture department. The value of such information would be useful in identifying strengths and weaknesses in time management.

References


