

1 **Factors associated with the institutionalization of a physical activity program in**
2 **Australian elementary schools**

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17 **Funding Sources:** This project was supported in part by the Bluearth Foundation and
18 Victoria University.
19

20 **Conflicts of Interest:** All authors declare that they have no conflicts of interest.
21

22 **Human Rights:** All procedures performed in studies involving human participants were in
23 accordance with the ethical standards of the institutional and Department of Education research
24 committees and with the 1964 Helsinki declaration and its later amendments or
25 comparable ethical standards.
26

27 **Informed Consent:** Informed consent was obtained from all individual participants included in
28 the study.
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39 **Abstract**

40 **Background:** The health benefits of classroom based physical activity programs may only be
41 sustained if programs are continually implemented over time. Despite the importance of instituting
42 physical activity programs to ensure their continued implementation, little is known about factors
43 associated with institutionalization of programs at a school level.

44 **Purpose:** To examine how school context, principal characteristics, and program attributes are
45 associated with the institutionalization of Bluearth Foundation's Active Schools program in
46 Australian elementary schools.

47 **Methods:** Current principals from schools who participated in the Active Schools program between
48 2015-2017 reported the level of institutionalization of the program, school context, principal
49 characteristics, and perceived attributes of the program. Univariate associations were calculated using
50 Pearson's correlation coefficient, independent sample t-tests and one-way ANOVA. Linear regression
51 using backward deletion was used to calculate significant or marginally significant ($p < 0.1$)
52 multivariate associations.

53 **Results:** Thirty of the 211 eligible principals participated in the study. School capacity ($r = .617$,
54 $p < .001$); perceived student behavioral ($r = .577$, $p < .001$), health ($r = .499$, $p < .001$), and enjoyment
55 benefits ($r = .529$, $p < .001$), relative advantage ($r = .417$, $p = .022$), observability ($r = .385$, $p = .036$), and
56 having the program delivered by a Bluearth coach at the time of the study ($\eta^2 = .426$, $p < .001$), all had a
57 significant positive univariate association with institutionalization. School capacity ($\beta = 1.802$, $p = .001$),
58 observability ($\beta = 0.902$, $p = .061$) and having the program delivered by a Bluearth coach at the time of
59 the study ($\beta = 2.580$, $p = .003$) remained significant in the final multivariate model.

60 **Conclusions:** Results suggest schools which have someone who can provide support implementing a
61 program are more likely to institute the program into policies and practices. It is also important school
62 administrators have the tools to evaluate the benefits of physical activity programs and to perceive
63 them as being beneficial for their students. However, schools may struggle to institutionalize physical
64 activity programs after formal program delivery has concluded.

65 **Keywords:** sustainability, physical activity, school, health promotion, implementation

66 **Background**

67 Classroom based physical activities include the integration of physical activities into academic
68 lessons, or short bouts of physical activity completed between the delivery of academic content.
69 Classroom based physical activity may also take the form of structured physical activity sessions
70 beyond those routinely delivered as part of the Physical Education curriculum. Research has
71 demonstrated the potential of classroom based physical activity interventions to increase levels of
72 physical activity in elementary school students [1, 2]. Additionally, there may be added benefits of
73 combining mindfulness and physical activity components in interventions on physical activity
74 behaviors [3]. There are several physical, mental and cognitive benefits associated with the
75 engagement in physical activity in children [4]. Evidence also suggests classroom based physical
76 activities may have positive effects on elementary school student's classroom behavior, cognitive
77 functioning and academic achievement [2, 5]. However, the public health benefits of school based
78 physical activity programs may only be achieved if effective programs are maintained within a school
79 over a sustained period of time [6, 7].

80 The sustained implementation of physical activity programs may depend on the degree to which the
81 program is institutionalized at a school [8]. Institutionalization is the degree to which a program is
82 routinized and incorporated into an organization's policies and practices [9]. For example, classroom
83 teachers from schools which institute policies and guidelines for the implementation of physical
84 activity programs are significantly more likely to continually implement the program in their
85 classroom [10]. Additionally, classroom teachers who have physical activity scheduled into their
86 timetables are more than twice as likely to implement physical activity sessions with their students
87 [11]. Whether administrators support a program and provide resources, such as suitable equipment,
88 facilities, space and time to deliver the program, may also be important in ensuring the sustained
89 implementation of physical activity programs in schools [7, 12].

90 Although institutionalization of physical activity programs in schools' policies and practices may be
91 important to ensure its sustained implementation, little is known about factors associated with
92 institutionalization of physical activity programs in elementary schools. However, research on the
93 scaling up of health promotion interventions has highlighted organizational, policy maker, and
94 program factors are likely to act as facilitators and barriers to institutionalizing programs into policy
95 and practice [13]. For example, contextual factors that may be associated with whether a program is
96 institutionalized include whether a program is compatible with existing organizational (i.e., school)
97 structures and accepted by employees (i.e., teachers) [14]. Program institutionalization may also
98 depend on whether an organization has the necessary human and financial resources to continually
99 implement the program [13]. Additionally, policy makers (i.e. principals), determine priorities and
100 make decisions about what to institutionalize into policy and practice [15]. Therefore, principal
101 characteristics such as the degree to which they value physical activity may be associated with the
102 institutionalization of a physical activity program in their school. Considering attributes of the
103 program, programs that address a need, are simple to implement, and are able to be monitored and
104 evaluated are more likely to be institutionalized [13, 16]. Therefore, the present study aims to examine
105 how principal characteristics, school context, and attributes of the program are associated with the
106 institutionalization of an evidence-based physical activity program in elementary schools.

107 **Bluearth Active School's Program**

108 The present study investigated Bluearth Foundation's Active Schools program.. The Active Schools
109 program is a real-world word (i.e., non-researcher led), elementary school focused, evidence-based
110 program that improves student's physical activity, health outcomes, and academic performance [17,
111 18]. The Active Schools program includes dedicated physical activity sessions, mindfulness-based
112 activities, movement-based activities incorporated into academic lessons, and active breaks during
113 academic lessons. Physical activity sessions are delivered in schools on a weekly basis for 60 minutes,
114 alternating between Bluearth coaches and classroom teachers. The program seeks to develop a
115 positive school movement ethos and culture, and school principals are encouraged to develop formal
116 policies and timetabling to support physical activity inside and outside of the classroom. The program

117 also seeks to build the capacity of teachers to deliver all aspects of the program with their students.
118 Teacher training includes professional development workshops, online support materials, and weekly
119 training with a Bluearth coach during the physical activity sessions. More information about the
120 Active Schools program can be found on the Bluearth Foundation’s website [19].

121 **Participants**

122 Participants eligible for this study were current principals from schools which had been involved with
123 the Active Schools program at any time from 2015-2017. Eligible participants were principals at the
124 school at the time of the current study, regardless of whether they were employed by the school when
125 the Active Schools program was last delivered there by the Bluearth Foundation. Bluearth provided
126 details of schools that were involved in Bluearth’s Active Schools program between 2015-2017.
127 Participant recruitment occurred in three stages. First, approval was requested from the relevant
128 school jurisdiction ethics committees; second, Bluearth Foundation’s CEO sent emails addressed to
129 principals to inform them the study was taking place; finally, study researchers invited principals to
130 participate in the study, initially via mail and then email follow-up for those who did not respond to
131 the mail invitation. Principals were asked to provide email consent to the research team for their
132 school to participate in the study and complete an online questionnaire.

133 **Procedures**

134 Data were collecting using an online questionnaire from March to September 2018, administered
135 using Qualtrics (Provo, UT) software. Several evidence-based strategies were used to increase
136 response rates, including initially contacting principals via mail, providing principals the opportunity
137 to go in to the draw to win a \$100 gift voucher in jurisdictions with ethical approval to do, and
138 sending two reminder emails to non-respondents [20].

139 **Measures**

140 *Institutionalization of the Bluearth Program* was assessed using a modified version of the Level of
141 Institutionalization Scale for Health Promotion Programs [9]. The measure included 9 items;
142 examples of items include: “*Have goals and objectives for the continual implementation of the*

143 *Bluearth program by the teachers at your school been put in writing?*"; *"Has a timetable or schedule*
144 *for the implementation of the Bluearth program by teachers at your school been mandated?"*; and
145 *"Does your school have permanent physical spaces assigned where the Bluearth program can be*
146 *conducted by teachers?"*. Reponses options were no = 0 and yes = 1, which were summed to give a
147 total program institutionalization score between 0-9. A higher institutionalization score indicates a
148 school has taken more formal steps to embed the Bluearth Active Schools program into their
149 curriculum and practices.

150 *Demographics* that were measured included the principal's age, gender, number of years' experience
151 as a principal, and their country of birth. At a school level, principals reported school type (1=public
152 school, 0=not a public school), whether the school had a specialist Physical Education teacher,
153 whether the Bluearth program was currently being delivered in their school at the time of the study.
154 Additionally, the school's Index of Community Socio-Educational Advantage (ICSEA) was recorded
155 from an online database (<https://www.myschool.edu.au/>).

156 *School context* was operationalized as the school climate, subjective norms and general school
157 capacity. School climate was operationalized as the prioritization of physical activity in the school,
158 measured using a single item developed by Mâsse, McKay, Valente, Brant and Naylor [10]. Principals
159 were asked to indicate how much they agree physical activity is a priority for their school (1=strongly
160 disagree, 5=strongly agree). Subjective norms were measured using a scale modified from Martin and
161 Kulinna [21]. Subjective norms were determined by assessing principals' perceptions of the beliefs of
162 different social groups (i.e. fellow administrators, teachers, parents, and students) towards the
163 importance of including the Bluearth Program in the curriculum (1=strongly disagree, 7=strongly
164 agree), and their motivation to comply with these beliefs (1=not at all motivated, 7=extremely
165 motivated). Subjective norm was calculated as the product of the set of questions for each social
166 group. These four composite scores were averaged to create a subjective norm score. General school
167 capacity was operationalized as the extent to which there is support for program implementation,
168 measured using a single item adapted from Carlson et al. [22], which asked how strongly principals

169 agree there is at least one person who can provide teachers with guidance for implementing Bluearth
170 activities at the school (1=strongly disagree, 4=strongly agree).

171 *Principal characteristics* that were measured were attitudes towards physical activity promotion, level
172 of physical activity, and perceived benefits of the program. The School Physical Activity Promotion
173 Attitudes Questionnaire (SPAPAQ) [23] was used to measure attitudes towards physical activity
174 promotion. An example of the items include “*Primary school classroom teachers should provide*
175 *physical activity for students daily as part of the school day.*” Items were measured on a 4-point
176 Likert scale from 1 = Strongly Disagree to 4 = Strongly Agree. The principal’s level of physical
177 activity was measured using a single item measuring the number of days in the last week they did a
178 total of 30 minutes or more of moderate-to-vigorous physical activity for recreation or transport in the
179 last week [24]. Perceived benefits of the program were measured using 7-item instrument developed
180 by Carlson et al. [22]. The items assessed how strongly principals agreed the program improved
181 student behavior, enjoyment and health. An example of the items include “*Students stay on task more*
182 *after they participate in the Bluearth program.*” All items were measured on a 4-point Likert scale
183 from 1=strongly disagree to 4=strongly agree.

184 *Attributes of the program* were measured based on an instrument developed from Rogers’ diffusion of
185 innovations theory [25]. The 9-items used assessed the relative advantage of the Bluearth program
186 over Physical Education, the simplicity of understanding and teaching the program, and the
187 observability of the outcomes of the program. An example of items included “*The Bluearth program*
188 *is better than Physical Education classes for physical activity promotion.*” All items were measured
189 on a 4-point Likert scale from 1=strongly disagree to 4=strongly agree.

190 **Data Analysis**

191 Univariate associations with standardized continuous variables were calculated using Pearson’s
192 correlation coefficient and associations with categorical variables were calculated using independent
193 sample t-tests and one-way ANOVA. Predictor variables with a significant ($p < 0.05$) univariate
194 association with institutionalization were entered into a single multiple linear regression model. Next,

195 backwards deletion was conducted to delete all predictor variables until only variables significant at
196 $p < 0.10$ remained in the model. The sample size was considered large enough to estimate accurate
197 regression coefficients for the number of predictor variables in the linear regression model [26].

198 **Results**

199 *Descriptive statistics*

200 Overall, 30 of the 211 eligible principals participated in the study (14% response rate). Schools that
201 participated in the study on average had the program delivered more recently by a Bluearth coach than
202 schools that did not participate ($p = 0.002$). There was no significant association between participation
203 in the study and school type (i.e., government or non-government) or level of socio-educational
204 advantage. Descriptive statistics for participants are displayed in Table 1.

205 **Table 1 about here*

206 *Bivariate and multivariate associations with institutionalization*

207 Results from univariate analyses on level of institutionalization are displayed in Table 2. Results show
208 having the Bluearth program delivered in the school by a Bluearth coach at the time of the study was
209 significantly positively related to institutionalization ($\eta^2 = .426$, $p < .001$). None of the principal
210 demographics were associated with institutionalization of the Bluearth program. Of the hypothesized
211 institutionalization factors, 6 of 11 had significant positive associations with institutionalization. From
212 school context, only general school capacity ($r = .617$, $p < .001$) was significantly associated with
213 institutionalization. From principal characteristics, perceived behavioral benefits ($r = .577$, $p < .001$),
214 enjoyment benefits ($r = .529$, $p < .001$), and health benefits ($r = .499$, $p < .001$) all had a significant
215 association with institutionalization. From attributes of the program, relative advantage ($r = .417$,
216 $p = .022$) and observability ($r = .385$, $p = .036$) had significant positive associations with
217 institutionalization of the Bluearth program

218 **Table 2 about here*

219 The results from the multivariate analysis are displayed in table 3. Having Bluearth delivered at the
220 time of the study remained significant ($\beta=2.580$, $p=.003$) in the multivariate analysis. Of the five
221 institutionalization factors that had a significant univariate association, only general school capacity
222 ($\beta=1.802$, $p=.001$) was significantly positively associated with institutionalization in the multivariate
223 model. Additionally, observability ($\beta=0.902$, $p=.061$) almost reached significance.

224 **Table 3 about here*

225 **Discussion**

226 The present study examined associations between the school context, principal characteristics and
227 attributes of the program and institutionalization of a physical activity program in Australian
228 elementary schools. Identifying factors associated with institutionalization of physical activity
229 programs is important because schools that institutionalize physical activity programs are more likely
230 to sustain program elements at their school [10] To the authors' knowledge, this is the first study to
231 examine factors associated with institutionalization of a classroom based physical activity program
232 into school policies and curriculum.

233 The results from this study show school capacity is associated with the institutionalization of a
234 classroom based physical activity program. Having at least one person who can provide teachers with
235 guidance on implementing a physical activity program is associated with taking more formal steps to
236 institutionalize the program into the schools policy and practices. This suggests having a staff member
237 at the school take an active role in championing the program may motivate principals to institute a
238 program into school policies and curriculum. However, these results could also be a result of reverse
239 causation whereby schools identify or appoint a staff member at their school whose role it is to
240 support the continued implementation of a program as a consequence of institutionalizing the
241 program. Nevertheless, it appears identifying and supporting a program champion to take a leadership
242 role may increase the likelihood health programs are sustained [27, 28]. Therefore, schools should
243 identify a staff member who can take an active role in advocating and supporting physical activity
244 programs.

245 This research also showed that observability of the program benefits were positively related to
246 program institutionalization. Therefore, principals should be made cognisant of tools and techniques
247 that allow them to evaluate the effectiveness of physical activity programs at their school. Having
248 tools to evaluate the program allows principals to make informed decisions about whether it is
249 worthwhile continuing to implement a program [14]. In univariate analyses, principal's perceptions of
250 the relative advantage of the Bluearth program, and perceived student behavior, health, and enjoyment
251 benefits were also associated with program institutionalization. Collectively, these findings suggest
252 principals take more steps to institutionalize a physical activity program when they are able to
253 evaluate the outcomes of the program and believe it provides valuable and tangible benefits for their
254 students above those of Physical Education.

255 The present study also found schools which reported not having the Active Schools program delivered
256 by the Bluearth Foundation at their school at the time of the study had significantly lower levels of
257 institutionalization than those who did have the program at their school at the time of the study. This
258 shows schools may struggle to institutionalize physical activity programs once the formal program is
259 no longer delivered at their school. Therefore, physical activity programs might be unsustainable
260 beyond the formal implementation of the program by researchers or, in the case of this study, an
261 external provider.

262 Considering many schools were unable to institutionalize the Bluearth Active Schools program into
263 their policies and practices, it appears continued investment in program delivery by an external
264 provider might be necessary to sustain a program and its associated benefits. Given the costs
265 associated with outsourcing the delivery of a physical activity program, it is likely this would impact
266 schools with limited financial resources who may be unable to afford the sustained implementation of
267 the program. Unfortunately, schools with the least financial resources are likely to be those in greatest
268 need of increased physical activity during the school day [29]. Although opportunities to apply for
269 funding and grants to deliver physical activity programs in schools do exist [30], these often involve
270 detailed application processes that in themselves are resource intensive, highly competitive, and are
271 short term in nature. Given the substantial evidence of the health and educational benefits of school-

272 based physical activity, it seems imperative governments at all levels provide leadership in school
273 physical activity promotion and adequately resource schools to implement and sustain physical
274 activity programs [31]. Historically, we have seen that government commitment and investment is
275 necessary to have a meaningful impact on population levels of physical activity [32].

276 Although this study contributes to the understanding of factors associated with the institutionalization
277 of physical activity programs at schools, it has some limitations that must be considered when
278 interpreting the results. First, although the sample size was large enough to estimate accurate
279 regression coefficients, the small sample size means the study may not sufficiently powered to detect
280 medium or small effect sizes. Secondly, this study employed a cross-sectional and quantitative study
281 design and therefore could only infer association not causation, and was limited in its ability to
282 provide an in-depth understanding of the influence of contextual factors. Thirdly, this study only
283 achieved a response rate of 14%, and those who responded were more likely to have the Bluearth
284 program delivered in their school by a Bluearth coach more recently. It is possible principals who
285 have not taken steps to institutionalize the program may not be motivated to participate in the study.
286 Finally, we could not verify whether the principal who completed the questionnaire was the principal
287 who was at the school at the time of the delivery of the Bluearth program.

288 **Conclusion**

289 Although instituting physical activity programs within schools may ensure sustainability, very little is
290 known about what factors are associated with program institutionalization. The findings of this study
291 showed schools who have someone who can provide support for implementing the program take more
292 steps to institute the program into policies and practices. Our findings also highlight that it is
293 important principals have the tools to evaluate the benefits of physical activity programs and perceive
294 that such programs are beneficial for their students for institutionalization to occur. However, schools
295 in this study which had taken more steps to formally institutionalize the program at the school had the
296 program delivered by the Bluearth Foundation at the time of the study. This indicates it may be
297 difficult for schools to embed the program into their policies and practices after the formal completion
298 of the program. Therefore, further research is needed to understand factors which may contribute the

299 institutionalization of evidence based physical activity programs in schools after the formal
300 completion of the program. The field would also benefit from future quantitative research to develop
301 an in-depth understand the influence of contextual factors on the institutionalization of physical
302 activity programs in schools. Additionally, research should identify ways to support schools to
303 institutionalize physical activity programs to ensure programs and their associated benefits are
304 sustained.

305 **Declaration**

306 **Acknowledgments:** We would like to acknowledge and thank the participants in the study. This
307 project was supported in part by the Bluearth Foundation and Victoria University. Bluearth
308 Foundation provided school contact details and made initial contact with schools to introduce the
309 study but had no role in school or teacher recruitment beyond this. The funding bodies had not role in
310 the design of the study, analysis, and interpretation of data or in writing the manuscript.

311 **Conflicts of Interest:** None to declare.

312 **Primary Data:** The authors have full control of the primary data. Request to access data sets can be
313 made to the corresponding author. Applicants will be required to gain ethics approval from the
314 Victoria University Human Research Ethics Committee and the applicable educational jurisdictions
315 human research ethics committees prior to being granted access to data.

316 **Authors Contribution:** Author 1 contributed to the design of the study, conducted data collection,
317 analysis and interpretation and contributed to the write-up of the manuscript; Author 2 contributed to
318 the design of the study, assisted with data collection, interpretation of data and write up of the
319 manuscript; Author 3 conceptualized the study, managed the project and contributed to all aspects of
320 the study.

321 **Ethics Approval:** Ethics approval was received from the Victoria University HREC (HRE18-016)
322 and all educational jurisdictions involved in the study. All participants provided consent to be
323 involved in the study.

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406 Table 1- Descriptive statistics

<i>School Demographics (n=30)</i>	<i>%</i>
Public School	60.0
Blueearth currently at School	73.3
ICSEA (M[SD])	980.77[58.48]
Specialist Physical Education Teacher	40.0
<i>Principal Demographics (n=30)</i>	<i>%</i>
Female %	63.3
<i>Age %</i>	
20-39 years old	20.0
40-49 years old	13.3
50-59 years old	56.7
60 years or older	10.0
Australian born	96.7
Principal years' experience (M[SD])	8.11[8.83]
Institutionalization Score (M[SD])	4.83[2.78]

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Table 2- Univariate associations with institutionalization of Bluearth Foundation’s Active Schools program

	Pearson’s r	p-value
School demographics		
ICSEA	-.132	.486
Principal demographics		
Years’ Experience as Principal	.192	.309
School Context		
School Climate	.183	.333
School Capacity	.617	<.001
Subjective Norms	.235	.210
Principal Characteristics		
Level of Physical Activity	.115	.543
Physical Activity Promotion Attitude	.267	.153
Student Behavior Benefits	.577	<.001
Student Enjoyment Benefits	.529	<.001
Student Health Benefits	.499	<.001
Attributes of the Program		
Relative Advantage	.417	.022
Simplicity	.338	.068
Observability	.385	.036
School demographics		
	M(SD)	p-value
School Type		
Public School	4.39(2.85)	.291
Not Public School	5.50(2.65)	
Specialist PE Teacher		
Yes	5.42(2.81)	.357
No	4.44(2.77)	
Bluearth Currently Delivered		
Yes	5.91(2.05)	<.001
No	1.88(2.41)	
Principal demographics		
Gender		
Female	4.79(2.94)	.912
Male	4.91(2.63)	
Age		
20-39 years old	3.67(1.75)	.581
40-49 years old	4.75(3.95)	
50-59 years old	5.41(2.87)	
60 years or older	4.00(2.65)	

Bolded figures significant at p<.05

417

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420

Table 3- Significant multivariate associations with institutionalization of Bluearth Foundation's Active Schools program

Factor	Coefficient (95% CI)	Sig
Bluearth Currently Delivered	2.580 (0.930, 4.230)	.003
School Capacity	1.304 (0.600, 2.008)	.001
Observability	.666 (-0.032, 1.365)	.061
Intercept	2.941 (1.569, 4.314)	<.001

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