A Study of the Effects of Facility and Service Provision on Physical Activity among Students and Staff at MCAST

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Abstract: Physical Inactivity is considered a key global risk factor for non-communicable diseases and premature mortality. In its 2017 global action plan, the World Health Organization (WHO) committed to reducing inactivity by 10% by 2025, representing a call-to-action for researchers worldwide to further explore physical activity (PA) trends in applied real world contexts. While research in Malta has revealed some valuable insights about PA among children and youths in compulsory education settings, less is known about the early adulthood years and the effect of higher education settings on PA habits. A cross-sectional survey design, and mixed methods approach to analysis was therefore developed to investigate PA trends among students and staff at MCAST, in light of various international trends and existing organizational structures at the college, namely, the effects of the provision and organization of facilities and activities on campus. The results show that 44% of students and staff at MCAST achieve WHO recommendations, while controlling for the effects of sports students’ PA levels the rate fell to 31% among the remaining student population, and 36% among staff. The achievement of PA recommendations was generally reflective of international trends in college and university settings, while the data on facility-use and activity-participation among various stratifications of students and staff are presented in the findings as a detailed model for assisting prospective development of more relevant, engaging, and effective PA-related initiatives and policies at MCAST.

Keywords: Physical Activity (PA), inactivity, college and university, further and higher education, organisational culture.

Introduction

Physical inactivity is now recognized as a key risk factor for non-communicable diseases (NCDs) worldwide and is classed as a ‘pandemic’ of comparable severity to smoking (Reis et al. 2016: 9). According to Foster et al. (2017), an inactive world is also an ‘unhealthier, uneconomic, and unsustainable’ (484) world. In a consequent bid to stem the prevalence of NCDs and premature mortality risk, the World Health Organization (WHO) announced the launch of a global action plan at the 70th World Health Assembly held in Geneva in 2017, outlining their commitment via global implementation of evidence-based policies and initiatives, to reduce inactivity by 10% by 2025.

Reis et al. (2016: 2) argue that the behavioural change required to increase Physical Activity (PA) levels globally in pursuit of this goal is only achievable if research projects are appropriately ‘scaled up’ and carried out in ‘real world’ contexts, or ‘realms’ like, for instance, city planning, transport, leisure, and education. The development of evidence-based policy as a catalyst for measurable increases in PA levels in the specific realm
of education, meanwhile represents a call-to-action for researchers embedded in educational settings. In higher education contexts, sedentary behaviour has been identified as particularly prevalent (Headley et al. 2018) so, in accordance with WHO's commitment to evidence-based policy, the present study was conceived to explore PA at the Malta College of Arts, Science, and Technology (MCAST) from an organizational perspective. In other words, taking into account existing organizational initiatives and provision of services and facilities, the authors aimed to explore the existence of trends among students and staff at MCAST with regard to their participation in PA in the real-world context of college life and how such knowledge and insight may help inform various levels of policy and organisational initiatives vis-à-vis WHO's global action plan.

This paper presents the results of a cross-sectional mixed methods study designed to address these principal aims. A review of pertinent literature is presented first, followed by the articulation of a more nuanced set of research questions and associated hypotheses based on existing issues and trends both locally and abroad. A survey design was used, based on the initial dissemination of an online questionnaire, to which a sample of 197 students and staff based at the Paola campus during the 2018/19 academic year responded. Whilst the sample cannot be deemed to be truly random, all efforts were made to avoid issues of response bias and selective bias, allowing the sample to significantly reflect the population. Since the questionnaire comprised both closed and open questions, both quantitative and qualitative approaches were used to analyse the data.

**Literature Review**

To maintain healthier body weight and composition, as well as lower the risk of all-cause mortality, heart disease, type-2 diabetes, colon and breast cancer, and depression, WHO currently recommends at least 150 minutes of moderate (or 75 minutes of vigorous) PA per week, in bouts of at least 10 minutes. Muscle strengthening activities targeting all the major muscle groups of the body should also be carried out at least twice per week (World Health Organization 2019). These standards have been used to assess PA levels in a wide range of studies over the past two decades. As part of the implementation of the recommendations of the Council of the European Union on promoting health-enhancing physical activity and the European Non-communicable Diseases Action Plan 2012–2016, the European Commission and WHO regional office for Europe released a ‘factsheet’ in 2015 on PA participation in Malta. In the document, local authorities expressed their commitment to policies facilitating the development of a healthier and more active population (European Commission 2015), essentially reinforcing a need for local research in the area, if such policies are to be evidence-based.

According to a 2013 report by the Health Promotion and Disease Prevention Directorate, the proportion of Maltese youths aged 15 actually achieving WHO minimum PA recommendations was 20% overall, or 26% among boys and 14% among girls. Adults fared slightly better, with an average of 31% reportedly achieving the minimum recommendations. The 2018 factsheet did not cover the same age groups for youths but showed a 5% improvement among adults from 2015 (European Commission 2015; World Health Organization 2018). While this rate surpassed 10 other EU states and was among the highest values for states in the Mediterranean region (second only to Cyprus), the EU-wide average of approximately 46% indicates the sheer extent of the inactivity pandemic both locally and abroad. Only 10 of the 28 member states were able to demonstrate that a majority of their populations attained the minimum WHO recommendations.
While variance across age groups for children and adolescents are generally reflected in the EU/WHO reports, along with a distinctive focus on trends in educational institutions specifically during the compulsory schooling years, less is known about post-secondary settings. Adults are typically grouped together in a single category of between 18 to 64 years, making it difficult to identify precisely where the trends start to shift. Snedden et al. (2019) argued that the college years are instrumental for building a foundation for health-related behaviours lasting well in adulthood and, since Maltese adults have been shown on average to be more active then children and adolescents, college settings represent an enticing arena for exploring prospective evidence of changing PA behaviours.

International studies on PA in higher education settings suggest that college and university students generally reflect population-wide trends. In their college years, approximately half of American students have been shown to achieve the minimum recommendations (Keating et al., 2005), with males exhibiting slightly higher activity than females (Miller et al. 2005; Taeho et al. 2015). Closer to home, similar trends have been noted in Macedonia (Cesar et al. 2017), and Portugal (Clemente et al. 2016). In terms of sub-groups, Snedden et al. (2019) also highlighted the differences between student-athletes and wider student populations, revealing an additional dimension to student populations, given the popularity of sports and exercise science programmes and their tendency to attract a high proportion of students who are already active. Abula et al. (2018) found that knowledge of PA recommendations ultimately had an effect on actual PA levels, so students engaging specifically with the subject area may represent a confounding variable in any study of PA in higher education contexts.

With regard to staff, trends in US colleges and universities indicate a prevalence of sedentary behaviour, with academic staff shown to be slightly more active than non-academic staff. The high incidence of sedentary behaviour overall has been attributed to a ‘desk-based’ culture characteristic of academic settings (Headley et al. 2018). The concept of corporate wellness has gained prominence in recent years in response to just such trends observed in the wider economy, spurred on by emerging links being established between inactivity and NCDs. Poor health among employees is tangibly measurable in terms of productivity losses and sick days, as well as various forms of compensation associated with illness (Scherrer et al. 2010). The alarming rate of 64% inactivity among adults in Malta thereby provides very real motivation on the part of employers seeking quality service provision in further and higher education to actively promote PA.

It is worth noting, at this juncture, that the WHO recommendations define PA broadly in terms of daily family and community activities, to include active transport (walking and cycling), leisure (walking, hiking, dancing, gardening, etc.), as well as other activities like household chores, games, and sports. In other words, the recommended 150 minutes of PA need not be constituted exclusively by organized or structured PA (Figure 1), but can also include what Cesar et al. define as ‘unorganized’ PA (2017: 796). Examples of unorganized PA in workplace settings include climbing steps instead of using elevators, walking to colleagues’ desks or offices instead of sending emails where appropriate, and parking one’s car further away to increase walking distance. Among university staff in Indonesia, for instance, Qomariyah et al. (2019) found there was an optimal distance from the college affecting the propensity of staff to walk or drive to work, resulting in a significant difference in PA levels among staff according to their residential proximity to the college.
### Table: Examples of Organized and Unorganized Physical Activity

<table>
<thead>
<tr>
<th>Organized / Structured Physical Activity</th>
<th>Unorganized Physical Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>At home / with your family and friends</td>
<td>At home / with your family and friends</td>
</tr>
<tr>
<td>A 30-minute jog</td>
<td>Walking more at home</td>
</tr>
<tr>
<td>Body weight training at home</td>
<td>Outings such as hiking</td>
</tr>
<tr>
<td>Fitness classes</td>
<td>Household chores</td>
</tr>
<tr>
<td>Sports training</td>
<td>Games that require physical activity</td>
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<tr>
<td>Sports in the backyard etc.</td>
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<tr>
<td>At work</td>
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<tr>
<td>Organized running sessions</td>
<td>Climbing steps – instead of using elevators</td>
</tr>
<tr>
<td>Organized walks</td>
<td>Walking to colleagues’ desks – instead of sending an email.</td>
</tr>
<tr>
<td>Fitness classes/gym memberships</td>
<td>Parking one’s car further away to increase walking distance.</td>
</tr>
<tr>
<td>Fitness sessions at the office</td>
<td>Walking to work</td>
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</tbody>
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**Figure 1:** Examples of organized and unorganized PA as featured in the online survey, based on definitions set by WHO (2019)

The wide range of activities constituting WHO’s overall tally of desirable PA levels raises the important question about how these should be prioritized overall to optimize general fitness and health. Following a series of fitness and body composition tests on college students in the US, Pierce *et al.* (1992) found that, despite meeting minimum PA recommendations, cardiovascular fitness levels were nonetheless still relatively poor. They postulated that the concentrations of PA being performed were inappropriate and argued in favour of added structure and guidance in concerted efforts to promote PA for optimal results. So, while inherently unorganized forms of PA represent a vital proportion of WHO’s recommendations, and should be encouraged, they nevertheless represent constituents of overall PA that are ideally organized in a way that strategically maximizes long-term overall fitness and health.

The onus to organize or otherwise effectively plan such activities thereby falls on specialized health and PA professionals but, according to Keating *et al.* (2005), their efforts have been only moderately successful so far. Further to the importance of ‘real-world’ research stressed by Reis *et al.* (2016) and the general commitment by WHO towards evidence-based policy, continuing research on PA assumes increasing importance in ongoing attempts to address these shortcomings. In view of this, and some of the noted trends in the literature, the authors recognized the need for a study that contributes to both existing literature and applied practice and is grounded in the local realm of further and higher education. Their main aims included a clear indication of current PA trends among students and staff at MCAST, how current policy and infrastructure affect these
trends, and how this all fits into the broader context of WHO’s commitment to reduce global inactivity.

Questions and Hypotheses

Given the aims and some of the notable points arising from the literature, including the unknown variance in PA levels among Maltese adults aged 18–65, the tendency for male college students to be more active than their female counterparts, the tendency for students to be more active overall than staff, the tendency for academic staff to be more active than their non-academic counterparts, and the recognition by WHO of unorganized PA as a valid constituent of overall activity, the authors articulated the following set of more specific research questions and hypotheses:

**Question 1: What are the main PA trends among students and staff at MCAST?**

1.1 What proportion of MCAST students and staff perform recommended amounts of PA per week?

*Hypothesis A:* There is a significant difference in achievement of minimum PA recommendations among students, non-academic staff, and academic staff.

*Hypothesis B:* There is a significant difference in achievement of minimum PA recommendations among males and females overall.

1.2 What variance across age categories exists between adults aged 18–65 at MCAST?

1.3 To what extent do students and staff engage in *unorganized* PA at MCAST?

1.4 How do students and staff generally rate the importance of PA?

**Question 2: How are PA trends among students and staff affected by organizational structures and initiatives at MCAST?**

2.1 What proportion of their overall PA do students and staff perform exclusively at MCAST?

2.2 How are PA-related facilities at MCAST being used by students and staff?

*Hypothesis C:* There is a significant difference in facility-use among students, non-academic staff, and academic staff.

2.3 What is the level and nature of participation in activities organized by the MCAST sports department among students and staff?

*Hypothesis D:* There is a significant difference in activity-participation among students, non-academic staff, and academic staff.
2.4 What main barriers prevent students and staff from participating in PA at MCAST?

2.5 How do students and staff rate the extent to which MCAST encourages participation in PA?

Question 3: What are the attitudes, perceptions, and suggestions of students and staff with regard to PA participation and promotion at MCAST?

Methods

A cross-sectional survey design and mixed methods approach to analysis was developed to address the main research questions and test the associated hypotheses. The combination of self-reported PA data via questionnaires and Chi square testing to explore interactions between sub-groups within samples has been a common methodological configuration in PA research in college and university settings over the past three decades (Kelley and Kelley 1994; Miller et al. 2005; Abula et al. 2018; Bhumika et al. 2018; Qomariyah et al. 2019; Snedden et al. 2019).

An online Google-forms questionnaire was therefore developed to collect self-reported PA data, using a combination of closed and open questions. Personal and professional information was sought first, to establish sex, age, years spent at MCAST, as well as relevant distributions of participants according to role and institute affiliation. Next, participants were asked to describe their PA habits in a series of closed questions, resulting in a set of comparable categorical/nominal variables. Questionnaire items concerning unorganized PA, attitudes towards PA and organizational efforts to encourage it, as well as use of facilities and participation in activities organized by the sports department at MCAST were included to address Questions 1 and 2. In the final section of the questionnaire, which was designed to be completed in approximately 5 minutes in an effort to maximize participation, several open questions were also included to address Question 3, facilitating more varied and personalized feedback.

After obtaining ethical clearance from MCAST research administration, the questionnaire was distributed via internal email and various social media (Facebook) groups used by both students and staff. All students and staff studying or working at the MCAST Paola campus during the 2018/19 academic year were eligible to participate. Out of an estimated total population of approximately 12,500 students and staff (Rizzo et al, 2019: 18) a total of 197 respondents completed the questionnaire; the data were then imported to an open-source statistical analysis software package (GNU PSPP 1.0.1) for analysis. The precise composition of our sample is shown in Figure 2:
Figure 2: Composition of the sample according to sex/gender, age, role and institute/department affiliation.
Both quantitative and qualitative methods of analysis were used to interpret the data. Descriptive statistics were used to address Questions 1 and 2, combined with a series of inferential statistical tests to address the associated hypotheses and further explore emerging relationships in the data, namely Chi Square, Student's T, Mann-Whitney U, Kruskal-Wallis, and Pearson's R correlation tests. A confidence interval 95% was used. Finally, the open questions were analysed using a four-stage (decontextualisation, re-contextualization, categorisation and compilation) inductive qualitative content analysis, as described by Bengtsson (2016).

Results and Discussion

Following are the results and key discussion points emerging from our analyses of the survey data, presented in accordance with the original research questions and hypotheses.

Question 1: What are the main PA trends among students and staff at MCAST?

1.1 What proportion of students and staff at MCAST perform recommended amounts of PA per week?

When asked to rate their participation in PA per week in terms of time, 44% of participants overall chose categories representative of approximately 150 minutes or more, as per WHO's minimum recommendations. When considering that 43% (n=29) of the total number of full-time students (n=67) who participated were sports students, it is clear that the 44% recommendation-achievement rate was somewhat skewed in favour of higher PA levels, since there was a significant difference between sports and non-sports students with regard to whether or not they met the minimum recommendations ($X^2=26.12$, df=4, $p<0.001$). Among the sports students alone 83% (n=24) achieved the minimum recommendations, while for non-sports students (n=12), the rate fell to 31%. When adjusted for non-sport-student participation, the results converge more closely on the wider national trend of 31-36% recommendation-achievement among Maltese adults between 2015 and 2018 (European Commission 2015; World Health Organization 2018), which is discussed in more detail under Question 1.3.

Hypothesis A: There is a significant difference in achievement of minimum PA recommendations among students, non-academic staff, and academic staff.

The proportions of recommendation-achievement according to sex and role shown in Figure 3 (below) give a more complete picture of the amounts of PA performed by students and staff at MCAST.
Figure 3: Recommendation-achievement according to sex and role

The significance level (p<0.001) shows that the data, given the assumption of equal variance across groups, was sufficient to reject the null hypothesis that no statistically significant difference exists between PA levels according to role ($\chi^2=28.26$, df=8). The findings, therefore, mostly support the trends noted in the literature (Scherrer et al. 2010; Headley et al. 2018), that students tend to be more active than staff, and academic staff, are in turn, slightly more active than non-academic staff.

**Hypothesis B:** There is a significant difference in achievement of minimum PA recommendations among males and females overall.

Contrary to the findings of Miller et al. (2005) and Taeho et al. (2016), the sample did not reveal a statistically significant difference in PA between males and females overall ($\chi^2=4.46$, df=6, p=0.62). The data given the assumption of equal variance between participants who chose to indicate their sex as either male or female was not sufficient to reject the null hypothesis that no statistically significant difference exists between males and females at MCAST in terms of their achievement of PA recommendations.

1.2 Do students and staff engage in unorganized PA at MCAST?

Overall, a majority of 60% (n=118) said they engaged in some form of unorganized PA on campus. Of these, there was a statistically significant variation among groups according to role ($\chi^2=14.88$, df=4, p=0.005), reinforcing the tendency for sports students to be the most active among the general student population, and students overall to be more active than staff. The following bar-chart accordingly indicates engagement in unorganized PA by role:
Figure 4: Participation in unorganized PA according to role

The specific forms of unorganized PA the students and staff engaged in at MCAST are indicated in Figure 5 (below):

Figure 5: Prevalence of unorganised PA types

WHO recommend the systematic inclusion of stand-up desks and walking meetings in office environments, as well as encouraging organizations to offer incentives or subsidies to employees who implement such practices (World Health Organization 2019). For the majority of MCAST students and staff, climbing stairs and walking on campus were the most prevalent forms of unorganized PA, suggesting that prospective initiatives designed to promote unorganized PA on campus might specifically cater to these
reported preferences. Embellished routes and pathways between institute buildings and incentives to curb the use of lifts may be positively received by students and staff. Also, given that non-academic staff were less active than academic staff, and non-sports students in turn less active than sports students, a prospective MCAST physical activity policy might consider tailoring prospective incentives accordingly.

1.3 What variance across age categories exists between adults aged 18 to 65 at MCAST?

The 2018 WHO factsheet for Malta reported that 36% of the adult population between the ages of 18 and 65 achieved the minimum PA recommendations (World Health Organization 2018) but did not specify how activity levels vary between different subgroups within this relatively broad category. Given that students and staff at MCAST are generally representative of the 18 to 65 adult age-span categorized by WHO, the authors took the opportunity to explore any variances observable therein; however, no statistically significant difference ($\chi^2=12.07$, df=12, $p=0.44$) in recommendation-achievement according to the age groups indicated in Figure 6 (below) was found.

![Figure 6: Recommendation-achievement according to a more detailed distribution of adult age categories](image)

The findings do not provide additional insights on the assumed variance between adults of different ages, or where prospective shifts in trends exist between the lower PA achievement reported among Maltese children/adolescents, and the higher achievement reported among adults. While existing research data has provided some valuable insights about PA trends among Maltese children and youths (Decelis et al. 2014; European Commission 2015), future research specifically focussing on PA among adults in higher education settings and the wider population may help identify some of the critical stages of changing activity behaviours.
1.4 How do students and staff generally rate the importance of PA?

No single group was more likely to value the importance of PA more highly than others (t=0.45, df=189, p=0.653). All the respondents reported generally positive attitudes towards PA on the 5-point Likert scale provided (m=3.75, sd=1.09). Abula et al. (2018) showed that among college students in China, awareness about PA was positively correlated with actual PA levels. Scherrer et al. (2010) similarly showed that interventions designed to raise awareness can result in measurable positive results, helping to substantiate the validity of any prospective local initiatives, given the existing positive attitudes among students and staff towards PA. Indeed, participants elaborated this point further in their answers to the open question items, presented later under Question 3.

Question 2: How are PA trends among students and staff affected by organizational structures and initiatives at MCAST?

2.1 What proportion of their overall PA do students and staff perform exclusively at MCAST?

The questionnaire items related to volume of PA per week were originally categorical/nominal variables, providing brackets of time for quick and easy selection by participants of a distinctive and correct option (e.g. 1 to 2 hours per week, 2 to 3, 3 to 4, etc.). By taking the middle value of each category, the authors took the two questionnaire items for activity performed overall, and activity performed exclusively at MCAST, and approximated the comparative proportions for each participant as a percentage of overall PA performed exclusively at MCAST. The approximations resulted in a relatively large spread (sd=31.79), and a final mean value of 17.31%. Since the proportions were not normally distributed, a non-parametric Kruskal-Wallis test was run to investigate proportions by role. The distribution of proportions indicated below in Figure 7 (below), was significantly different across roles ($X^2=22.98$, df=4, p<0.001).
Figure 7: The proportion of total PA performed exclusively at MCAST

Sports students performed almost a third of their total activity exclusively at MCAST, followed by non-academic staff who, despite being less active than academic staff, were more likely to perform a higher proportion of this activity exclusively at MCAST. In this sense, academic staff performed the lowest proportion of their PA exclusively at MCAST, showing they are more likely to engage in activity elsewhere.

2.2 How are PA-related facilities at MCAST being used by students and staff?

Hypothesis C: There is a significant difference in facility-use among students, non-academic staff, and academic staff.

Overall, 55% (n=108) of respondents said they had used PA-related facilities at MCAST during the 2018/19 academic year. When controlling for non-sports students' use, given that sports-students are by default required to use the facilities as part of their studies, the proportion dropped to 43% (n=70) among the remainder non-sports students, academic staff, and non-academic staff (n=162). The data, given the assumption of equal variance across groups, was sufficient to reject the null-hypothesis that there is no statistically significant difference in facility-use according to role. Figure 8 (below) shows the corrected and statistically significant ($\chi^2=34.38, \text{df}=5, p=0.001$) break-down of facility-use according to role:
Further to the trends noted in the literature that students tend to be more active than staff (as corroborated in Question 1), a more detailed investigation of voluntary use of the facilities reveals, however, a more nuanced dynamic at play in the further and higher education context. Snedden et al. (2019) acknowledged that student athletes and sports students represent a significant factor in studies of PA in college and university settings. Indeed, as shown in Figure 8 (above), the corrected statistic actually portrays the general student population as least likely to use sports and PA facilities at MCAST, and less so than staff. In terms of facility-use by institute, there was also a statistically significant ($\chi^2=36.74$, df=9, p<0.001) difference among students and staff reporting use of the facilities.

**Figure 8: Use of facilities according to role, controlling for sports students**

**Figure 9: Percentage of facility-use according to institute**
While a high prevalence of facility-use among students and staff at the Institute of Community Services is expected given that the sports courses form part of this institute, the low rate of use among students and staff at the Institute of Applied Sciences appears to warrant further investigation of possible institute-specific barriers in greater detail. Figure 10 (below) show awareness and actual use of the various facilities available at MCAST respectively, with the indoor basketball courts, fitness centre, and outdoor football pitches representing the most popular facilities overall. These figures are not controlled for sports-students' use, and so represent an accurate picture of actual awareness/usage of facilities and their consequent availability.

Figure 10: Difference between participants' awareness and usage of the existing sports facilities at MCAST

The authors also ran a non-parametric Mann-Whitney U test to explore the relationship between facility-use and proportion of PA performed exclusively at MCAST (U=2042.50, p<0.001); it resulted that those students and staff who actually made use of the facilities were more likely to go on to achieve a majority of their overall PA exclusively at MCAST (m=26.85, sd=35.61) than those who did not (m=6.32, sd=22.76). In other words, those who actually use the facilities tend to do so regularly and are less likely to engage in PA outside MCAST. Controlling for sports students' use, ultimately, a majority of 57% (n=92) of the participants reported they had never used the PA facilities available at MCAST, clearly showing such assets are not currently being effectively capitalized upon outside the context of the sports courses.

2.3 What is the level and nature of participation in activities organised by the MCAST sports department among students and staff?

Overall, 45% (n=89) of students and staff said they had participated in activities organized by the sports department. Given that the sports department is a separate entity to the sports courses, participation among sports students is not compulsory, so they were once again included at this stage of the analysis.
Hypothesis D: There is a significant difference in activity participation among students, non-academic staff, and academic staff.

The combination of Hypotheses C and D were intended to further investigate the trends noted in the literature regarding varying PA habits among students and staff, specifically in the context of the organisational influences of facility availability and activity organisation. Once again, the data was sufficient to reject the null-hypothesis, assuming equal variance across groups, that there is no statistically significant difference in activity-participation according to role. In other words, there was a statistically significant variation ($\chi^2=26.57$, df=4, $p<0.001$) among roles in terms of their activity-participation, as indicated in Figure 11:

![Figure 11: Participation in MCAST sports activities, according to role](image)

Sports students were most likely to participate in voluntary activities, followed by academic staff, non-academic staff, and, lastly, the remainder of the student population of whom less than a third had engaged in a voluntary activity. Any promotional campaigns associated with future activities organized by the sports department might consider the poor participation rates among the wider student population by more specifically targeting this group. In terms of institute, participation rates are indicated in Figure 12. The distribution here was not statistically significant ($\chi^2=15.58$, df=9, $p=0.08$). The statistic for participation by the Institute of Applied Sciences specifically, however, suggests that the potential existence of institute-specific barriers remains a worthy focus for further study.
Figure 12: Participation in MCAST sports activities, according to institutes

As shown in Figure 13, the most popular activity was overwhelmingly ‘Spring days’, an annual event held at a popular local sandy beach.

Figure 13: Sports activity popularity

It should be noted that, while attendance at Spring days is compulsory among students and staff, participation in the activities themselves is not. In other words, while all students and staff attend the event, not all participate in the physically active games and activities.
themselves and instead choose to spend the day engaged in less active recreation. It should also be noted that this distinction between active and inactive participation in *Spring days* may have caused some ambiguity in participants’ replies, resulting in data skewed towards an overly optimistic depiction of activity-participation.

Furthermore, it can also be argued that low participation in the remaining activities need not necessarily be perceived as a negative outcome. In other words, those who actually participated in such activities may have otherwise been inactive. The participation rates, however low they may be, would in this sense be representative of a considerable degree of success and more activities would in turn increase the likelihood of engaging higher proportions of otherwise inactive students and staff. Future studies might further explore this notion, in an attempt to ascertain the true impact factor of such activities and explore more personalized underlying conditions influencing activity-participation among students and staff.

The activities cited here are organized by a relatively small sports department, which is administratively distinct from the sports courses. The relatively poor overall participation rates appear to reflect the fact that nearly half of the participants (45%, \(n=89\)) were not aware of the existence of this department. Administrative departmental structures relating to PA at MCAST are discussed in more detail under Question 3.

2.4 What main barriers prevent students and staff from participating in PA at MCAST?

The bar chart in Figure 14 indicates the barriers selected by participants, with ‘lack of time’ representing the most common choice:

![Bar Chart](image)

**Figure 14**: Barriers against participation in PA at MCAST
Participants reinforced and further elaborated the problem of insufficient time in their answers to the open questions, also discussed under Question 3. Few considered the lack of facilities as a barrier to their participation in PA, although the additional facilities that underpin their use, like suitable showers and changing rooms, did emerge as the more notable problem.

2.5 How do students and staff rate the extent to which MCAST provides encouragement to participate in PA?

Overall, the participants gave relatively poor ratings of perceived encouragement by MCAST using the 5-point Likert scale provided (m=2.43, sd=1.13), with staff, according to a T test (t=4.46, df=189, p<0.001), rating it significantly less (m=2.16, sd=0.98) than students (m=2.88, sd=1.22). The authors ran some additional tests to investigate this result further and found a moderate-to-weak (r=-0.29) yet statistically significant (p<0.001) inverse correlation between years spent at MCAST and the encouragement rating. In other words, the longer staff or students remain at MCAST, the less they tend to perceive MCAST as encouraging with respect to participating in PA. There was also a weak but statistically significant correlation between proportion of activity performed exclusively at MCAST and the encouragement rating (r=0.16, p=0.04), suggesting that, irrespective of years spent at MCAST, those who perform most of their PA at MCAST were more likely to positively rate perceived encouragement.

Question 3: What are the attitudes, perceptions, and suggestions of students and staff with regard to PA participation and promotion at MCAST?

The final four open questions of the questionnaire were intended to give participants the opportunity to make comments and suggestions about PA provision at MCAST and describe their perceptions of strengths and areas for improvement. The prominent themes emerging from an inductive qualitative content analysis (Bengtsson 2016) of these answers included; (i) lacking communication and promotion of facilities and activities, (ii) the need for a physically active culture on campus, (iii) a desire for additional facilities and services, and (iv) general acknowledgement of existing initiatives generally as a good and positive start.

The participants felt that new and existing facilities and activities had not been adequately communicated or promoted. More visible and concerted efforts at promotion would also serve as confirmation of a commitment by the college management and administration towards supporting PA on campus. Participants showed an interest in receiving information about more frequent and regular programmes and activities related to PA and that such events should assume greater prominence in the yearly academic calendar. Furthermore, such communication should be timely, and ultimately more engaging, than the mere provision of PDF circulars as email attachments. Building more active communities across institutes would, in this sense, depend on a more personalized and animated communicative approach.

An effectively communicated programme rich in PA initiatives would in turn support the notion of a broader underpinning physically active culture at the college. The participants specified that such a culture must embrace both the main campus as well as the college’s satellite centres, and that it be inclusive of all ability levels and disadvantaged groups. Furthermore, participants emphasized that this culture be constructed to reflect and
support the wider national PA-related approaches and strategies. Taeho et al. (2015) showed that international students at an American university were less active than local students. Future research might therefore explore possible differences between international and local students at MCAST and how additional support might be provided for better inclusion in the context of PA among international students, as an intrinsic and important facet of college life.

Promoting a more physically active culture would inevitably serve an evident consensus among the participants, characterized by their general desire for increased facilities and services. Lack of time was presented by the participants as an important factor to be addressed by college administrators, both in terms of scheduled periods factored into timetables, as well as an extension of opening times of facilities like the fitness centre, which would ideally be available beyond normal lecturing hours, thereby permitting students and staff to exercise at the end of their study or work day. Campus design and layout conducive to increased activity, as well as the introduction of incentives to participate, were also discussed, along with the potential development of various additional facilities and services including a jogging track, a pool, shaded outdoor spaces for other forms of exercise, as well as personal training and consultation services, fitness classes, team-building activities, competitions/tournaments, and specialized services for students and staff with various health challenges. One participant indicated a willingness to pay for such services, while another stressed the importance that activity leaders be suitably remunerated. Notwithstanding these suggestions, participants generally commented positively on the facilities and services already on offer at MCAST and saw them as a good start. The recent directive permitting the allocation of staff financial work resource allowance funds towards gym and pool memberships was also very well received among staff members.

Further to the findings presented and discussed under Question 2, where nearly half of the participants indicated a lack of awareness about the existence of the sports department, some confusion was clearly similarly evident in responses to the open questions regarding the structure of the sports department currently responsible for the organization and administration of facilities and sports activities on campus. While students and staff appeared to be familiar with the sports lecturing staff, and acknowledged their enthusiasm and professionalism, they were less familiar with the separate sports department as a distinctive administrative entity responsible for PA-related facilities and activities. A prospective MCAST policy on PA might consider closer integration of the sports courses and sports department, with the additional benefit of maximizing in-house expertise of embedded exercise and PA professionals and human resources in the form of academic staff and students involved in sports and exercise science programmes. Straker et al. (2018) discussed the concept of a ‘goldilocks principle’, wherein PA initiatives should be aimed at achieving the right amount and combination of various types of PA, further establishing a need to mobilize and maximize existing expertise for the development of appropriately structured programmes and initiatives for effectively enhancing overall fitness and health.

Conclusion

Overall, 44% of students and staff reported PA levels in quantities representative of WHO’s minimum recommendations. Given the relatively large proportion of sports students participating in the study and the variance seen among sub-groups by role, the data was somewhat skewed in favour of over representation of PA levels. When taking
into account the 36% recommendation-achievement rate among the wider Maltese population according to WHO (World Health Organization 2018), the corrected values for non-sports students (31%) and staff (36%) converged much more closely around the expected proportion. In this sense, the present study supports the existing data on PA trends in Malta; however, the further and higher education context did not reveal further insights about the assumed variance within the relatively broad adult age category between 18 and 64 years reported by the European Commission (2015) and World Health Organization (2018).

When factoring in the sports students, the overall recommendation-achievement rate of 54% shows that MCAST students engage in an equivalent volume of PA when compared to international trends which tend to converge on approximately half of respective student populations (Keating et al. 2005; Miller et al.; 2005; Taeho et al. 2015; Clemente et al. 2016; Cesar et al. 2017). Snedden et al. (2019) highlighted the significant effects of student athletes and sports students on overall student populations in terms of PA trends. The present study, in this sense, shows a significant difference between sports students and the wider student population in terms of facility-use and activity-participation, with the latter group demonstrating the lowest rate of engagement among students and staff overall.

To achieve WHO’s target of a 10% reduction in physical inactivity by 2025, MCAST would need to increase recommendation-achievement among students and staff to at least 54% over the next five-year period or, in other words, 2% per year engaging in 150 minutes of PA per week through college-based facilities, services, and activities. The specific trends in facility-use and activity-participation noted in the present study among various stratifications of students and staff, a majority of whom ultimately acknowledged the importance of PA, are meanwhile presented as a useful model for the development of more relevant, engaging, and effective PA-related initiatives and policies at MCAST.

Limitations and Future Research

Some bias towards increased participation was expected in this study. Since the questionnaire was explicitly investigating PA, a higher proportion of participants with an a priori interest in PA were more likely to complete and submit the questionnaire, resulting in some exclusion of those who are generally less interested in the area, and findings that were likely skewed in favour of an overly positive representation of the phenomenon. Also, while self-reported PA levels are partial to subjective error (Keating et al. 2005), alternative methods and instruments may yield more objective and accurate data in future studies of this kind. Future research based on larger sample sizes may also help monitor progress towards WHO’s global action plan goals in the lead-up to 2025.
References


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