II. Approach and Methodology

4. Research approach adopted

Issues to be addressed

4.1 There were a number of issues of concern on school-based drug testing, including for example privacy, confidentiality, consent, who should bear the cost, who should conduct the tests, the process of selecting subjects for testing, the process of testing, drug testing methods, false positive problems, the consequences of a positive drug test. The administration of the tests by schools may lead to a number of complex social, ethical and technical issues as well as adding to the heavy workload of schools. Strong resistance from schools and parents especially those from at-risk families may be encountered. [4]

4.2 Indeed, as pointed out by the Australian National Council on Drugs, there was a range of social, economic, ethical and legal disadvantages of school drug detection and screening, such as potential stigmatization, discrimination and alienation of students who were subject to screening and detection, creation of mistrust, suspicion and loss of respect between teachers and students and/or parents and their children, and disengagement of young people from schools. [5]

4.3 Thus, in examining the feasibility of a school-based drug testing scheme, tailored to the school setting, for voluntary adoption by local schools, it would be necessary to address the various issues of concern including liberty of persons, possible labelling effect, ways to promote compliance among parents and students, the kind of sanctions and incentives to be provided, which party should conduct the drug tests, the funding of the scheme, support and referral services required, etc. [6] In other words, apart from assessing the effectiveness of the Scheme in achieving its intended objectives, it would be necessary to examine the direct and indirect effect of the Scheme on students, parents and schools, the implementation process as well as prohibiting and enabling factors affecting the effectiveness of

4 *Report of the Task Force on Youth Drug Abuse* (November 2008), p. 81 - 104.

5 Australian National Council on Drugs (2008), *Drug testing in schools: evidence, impact and alternatives*.

6 *Report of the Task Force on Youth Drug Abuse* (November 2008), p. 104.

the Scheme.

Evaluation paradigms

4.4 As noted by researchers, in assessing effectiveness and impact of social programs, the dominant evaluation paradigm adopted by researchers is based on the hypothetico-deductive methodology. Using experimental or quasi-experimental design, this method enables researchers to identify the causal relationship between certain outcomes and the "treatment". However, in order to gain insight into, for instance, why and how a program works, it has been suggested that the interpretivist or constructivist paradigm should be adopted, focusing on answering questions about the process and implementation, and what the experiences have meant for those involved.[7]

4.5 The hypothetico-deductive methodology, in its crudest form, depends on the conditions that the evidence supporting the hypothesis is true and the evidence is the logical outcome of the hypothesis. [8] This method is however not without limitations. For example, researchers pointed out that the method had problems in determining the relevance between evidence and hypothesis or theory. It could not distinguish and confirm or disconfirm a particular part of a theory. [9]

4.6 It may be noted that the two approaches reflect a researcher's belief about the nature of the world. The hypothetico-deductive methodology follows a positivist paradigm which maintains that the reality is fixed and the objective knowledge can be produced through rigorous methodology. An interpretivist researcher, on the other hand, maintains that knowledge is socially constructed and reality is ultimately subjective. Researchers also noted that the instruments used in positivist studies, especially those designed to quantify people's subjective feelings, were socially and culturally constructed.[10]

---

7 W K Kellogg Foundation (2004), *Evaluation Handbook: philosophy and expectation*.

8 Grimes, Thomas R (1990), "True, content and the hypothetico-deductive method", in *Philosophy of science*, 57: 514 – 522.

9 Rakover, Sam S (2002), "Reconstruction of past events from memory: an alternative to hypothetico-deductive method", in *Behaviour and philosophy*, 30: 101 – 122.

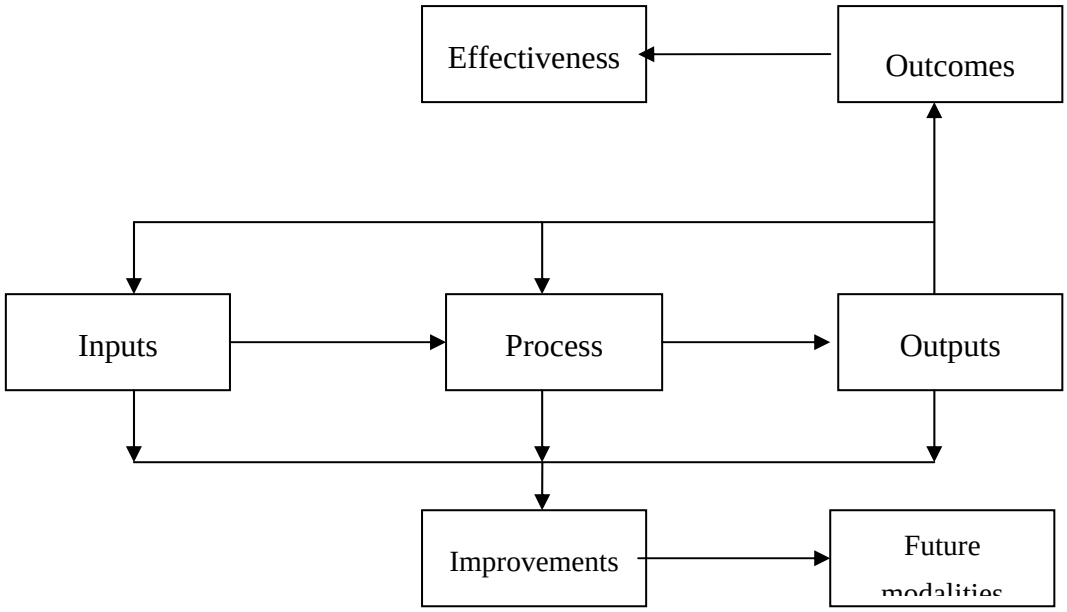
10 Broom, Alex and Willis, Evan (2007), "Competing paradigms and health research", in Saks, Mike and Allsop, Judith, *Researching health: qualitative, quantitative and mixed methods*.

4.7 The Project Team believes that in evaluating the Scheme, it is necessary to assess the impact of the Scheme, in a scientific manner, following the positivist approach. In addition, given the issues highlighted above, the Project Team has to gather views of stakeholders and other qualitative information related to the Scheme, following the interpretivist approach. However, given that the research only commenced after the launch of the Scheme, it was not possible to adopt a rigorous research design like a pre-post quasi-experimental design to examine the impact of the Scheme on students. Nevertheless, while relying primarily on the subjective views of students, parents, teachers and principals on the perceived effectiveness of the Scheme, following the interpretivist approach, the Project Team has attempted to gather quantitative data on students' awareness of drugs, attitude towards fighting drugs and drug taking behaviour.

Mixed method approach

4.8 Accordingly, a mixed method approach has been adopted by the Project Team in conducting the research. The Project Team is aware that school drug testing is highly controversial, with proponents citing prospects and in some cases evidences of positive impact in reducing abuse of drugs by students on the one hand, and opponents raising concerns involving practical, legal, ethical and educational issues. What is heartening to note is that both proponents and opponents share a common ground, namely appropriate actions must be taken promptly to abate the rising trend of drug abuse by children and youth. The Project Team is also aware that the Scheme is an additional new initiative, over and above a host of measures being implemented by schools in preventing drug abuse by students and helping those who have abused drugs to quit drugs.

4.9 The aim of the evaluation is to assess the Scheme in terms of programme reach, efficacy and implementation fidelity. In examining the process of implementing the Scheme, quantitative and qualitative information was obtained from various stakeholders. In addition, quantitative information on the outputs and outcomes of the Scheme was also gathered. The information collated had helped the Project Team evaluate the effectiveness of the Scheme in meeting its intended objectives and identify areas for improvement and modalities for future rolling out of school-based drug testing to other schools. The research approach adopted by the Project Team is depicted in the diagram below:



5. Research methodology

Overview

5.1 Both quantitative and qualitative information was collected in the research. To assess the impact of the Scheme, quantitative information on students' awareness of drugs, attitude towards fighting drugs, drug taking behaviour and perceived effectiveness of the Scheme was collected. In addition, quantitative data were collected on the views of principals, teachers and parents on the Scheme. Qualitative information on views of relevant stakeholders on the Scheme and suggestions for possible improvements were also gathered. References were made, through literature research, to practices of and research on school drug testing in other countries.

Other statistical information examined

5.2 In the school year 2008/09, a survey of a representative sample of secondary schools was conducted, as part of the 2008/09 Survey of Drug Use among Students commissioned by the Narcotics Division. Information collated in the survey included students' drug-taking patterns, awareness of drugs and

attitude towards fighting drugs. A random sample of 112 secondary day schools and 83,605 Secondary 1 – 7 students were enumerated in the survey.[11]

5.3 In addition, a survey was conducted by the Narcotics Division in December 2009 on all students in the 23 secondary schools in Tai Po, using a self-administered questionnaire. In the survey, information on students' awareness of drugs, attitude towards fightingdrug use as well as their views on the Scheme was gathered. A total of 19,121 Secondary 1 – 7 students were enumerated in the December 2009 survey.

5.4 In the present research, the Project Team has examined statistics obtained from the two surveys mentioned above, cross-referencing with those of the survey conducted by the Project Team in June 2010. It should be noted that the 2008/09 survey was not designed to provide precise estimates at the district level. Furthermore, the questionnaires used in the 2008/09 survey, the December 2009 survey and the June 2010 survey were different, rendering direct comparison difficult, if not impossible. As the 2008/09 survey, the December 2009 survey and the June 2010 survey were conducted in an anonymous manner, it is not possible to match data for individual students in the three surveys. Thus, any analysis of changes between say 2008/09 and June 2010 can only be made for all students or groups of students as a whole. Nevertheless, findings of the three surveys should be able to throw light on changes in students' awareness of drugs, attitude towards fighting drugs and drug taking behaviour over time, though the data could not be used for an assessment of the impact of the Scheme on students, following the usual pre-post design.

5.5 The June 2010 survey also covered a representative sample of students attending secondary schools outside Tai Po, serving as the control group. However, the Project Team is aware that the allocation of students to the experimental and control groups is not random.

Literature research

5.6 As part of the research, the Project Team has also undertaken a literature research of school drug testing. Firstly, peer-reviewed journal articles were

11 Narcotics Division, Security Bureau (2010), *The 2008/09 Survey of Drug Use among Students: Report.*

searched through academic databases like ProQuest, Academic Search Premier, Medline, Sociological Abstracts and Social Work Abstracts, using keywords "school based drug test" and "drug test". The search returned tens of thousands of references many of which were not relevant to the present study. The search was further refined by having the key words in quoted phrases and search returned about 188 references.

5.7 Another attempt was made by using the "360 Search and Webfeat" which gave lists of reference materials analyzed by topics. Using the keywords "random drug test", "drug testing", "school drug testing" and "drug detection", the search engine returned 307,400, 2,138,400, 417,300 and 948,800 pieces of reference materials respectively. Attempts were made to further refine the search by selecting relevant topics listed by the search engines, namely "drug testing", "drug abuse" and "illicit drugs", and excluding topics that were not relevant such as "cancer", "medicine", "pain", "virus", "cell", "HIV", "disease", "genetic", "resistance", etc. Based on this approach, 218 references were identified. Secondly, references cited by articles identified in the search of academic databases were used as leads to more references. It is believed that important and quality research and journal articles published on school drug testing should have been identified through this procedure. References presented in this report are those considered to be directly relevant to the present study.

Quantitative study: the June 2010 survey

Sampling design

5.8 In addition to students, the June 2010 survey also covered principals, teachers and parents. For secondary schools in Tai Po, all principals, teachers and students[12] and the parents of a random sample of students were invited to participate in the survey, using a self-administered questionnaire for principals, teachers and parents, and a group administered questionnaire for students. By end June 2010, the number of principals, teachers, students and parents enumerated in the survey on Tai Po secondary schools is summarized in the table below.

12 At the time of the post-survey, Secondary 5 and 7 students have already left schools and hence were not covered in the survey.

	Number sampled		Number enumerated		Response rate (%)	
	Schools	Respondents	Schools	Respondents	Schools	Respondents
Principals	23	23	23	23	100	100
Teachers	23	1,318	22	1,034	96	79
Students	23	14,542	22	13,110	96	90
Parents	23	3,558	22	2,494	96	70

5.9 It is noted in statistical surveys, a random sample of respondents is normally sufficient. Nevertheless, given that all students have been enumerated in the December 2009 survey, it is considered desirable to interview all students again in the June 2010 survey. This will facilitate analysis of changes in students' awareness of, attitude towards and their use of drugs, as well as their views on the Scheme, for students as a whole and at the sub-group levels (e.g. by age groups), without being subjected to sampling errors. Given that the proportion of students who have taken drugs is likely to be very small, including all students in the survey will ensure that the precision of survey findings on students who have taken drugs is not affected by the smallness of the sample size. Furthermore, by having a full coverage of all teachers and students of secondary schools in Tai Po, they were given a chance to express their views on the Scheme.

5.10 For secondary schools outside Tai Po, a two-stage disproportionate stratified random sampling design was adopted. In the first stage, a stratified random sample of schools was selected with types of schools as the stratification factor. The list of 429 secondary schools in districts outside Tai Po was first stratified by types of schools (government, aided and Direct Subsidy Scheme) and then sorted by district. A random sample of 150 secondary schools was randomly selected for the survey. By early July 2010, a total of 102 schools were enumerated in the survey, representing a response rate of 68%.

Types of schools	Total number of schools	Number sampled	Number enumerated	Response rate (%)
Government	32	10	7	70.0
Aided	366	110	76	69.1
Direct Subsidy Scheme	61	30	19	63.3
Total	**459**	**150**	**102**	**68.0**

5.11 In the second stage, for the schools sampled, the principals and teachers were all invited to participate in the survey, by completing a self-administered questionnaire. For students, a stratified random sample was selected with grade as the stratification factor. For each school sampled, one class was randomly selected

from each grade and all students in the class sampled were invited to participate in the survey, by completing a group administered questionnaire.

5.12 As regards parents, a non-overlapping stratified random sample of students was selected, with the stratification factor being grade. For each school sampled in the first stage, one class which did not overlap with the class already sampled for students was randomly selected from each grade and the parents of all students in the class sampled were invited to participate in the survey, using a self-administered questionnaire.

5.13 When the survey was conducted in June 2010, most schools were having school examinations. For some schools, it was not possible for the Project Team to distribute questionnaires to students and parents. As a result, the response rate at the second stage for students and parents was very low. Readers are cautioned to note this in interpreting findings of the June 2010 survey for students of schools outside Tai Po and their parents.

	Number sampled	**Number enumerated**	**Response rate (%)**
Principals	150	95	63.3
Teachers	6,600 *	4,227	64.0
Students	20,000 *	6,926	34.6
Parents	20,000 *	4,979	24.9

* estimated

Questionnaire design

5.14 The Project Team has made efforts to ensure that the questionnaire items for students in the June 2010 survey on awarenss of drugs, attitude towards fighting drugs and drug taking behaviour followed closely those adopted in the 2008/09 survey or December 2009 survey. To minimize response set, the question items on awareness and attitude were intermingled and worded in such manner that did not necessarily give the expectation of “agree” or “disagree” answers. In addition, for students of secondary schools in Tai Po, their views were solicited in the June 2010 survey on their participation in Scheme, the process of drug testing, impact of drug testing and expectations of and suggestions for future drug testing schemes. The questionnaire items were drawn with reference to views expressed by students through focus group discussions with them.

5.15 As noted by the Task Force on Youth Drug Abuse, personal, school and family were risk and protective factors affecting students' drug taking behaviour. [13] Therefore, social networks, performance at school, parental guidance and family relationship were explored in the questionnaires for students. This would facilitate more in-depth analysis of the survey findings based on the characteristics of the students and the extent of parental anti-drug guidance and supervision. The questionnaires used in the June 2010 survey of students of secondary schools in Tai Po and outside Tai Po are shown in Appendix 2.

5.16 As regards questionnaires for principals, teachers and parents, to facilitate comparison across different groups of stakeholders, the questionnaire items included in the questionnaires for students, where applicable, were also included in the questionnaires for principals, teachers and parents. In addition, views of principals and teachers were also sought on the preparatory arrangements for drug testing and the roles of teachers and school social workers in the Scheme. The questionnaire items were drawn up with reference to views expressed by principals, teachers and parents during in-depth interviews and focus group discussions with them. The questionnaires for principals, teachers and parents used in the June 2010 survey are shown in Appendix 2.

Data collection procedures for the June 2010 survey

5.17 The June 2010 survey was conducted in anonymous manner, with the identification of respondents not shown on the questionnaires. Names of schools were also not shown on the questionnaires. The processing of the questionnaires and the analysis of the survey findings were conducted without identifying names of individual students and individual schools.

5.18 For students, they were asked to complete a group administered questionnaire. The students sampled for the survey were assembled in the classrooms or school halls to complete the questionnaires, in the absence of teachers or other school personnel. Names of schools and students were not shown on the questionnaires. Researchers from the Project Team were responsible for distributing and collecting the questionnaires, and were present throughout the data collection process to answer any questions students might have on the

13 *Report of the Task Force on Youth Drug Abuse* (November 2008), Chapter 3.

questionnaires. Students were also assured that information provided by individual students would not be revealed and the survey data would be analyzed at an aggregate level, without revealing the identity of individual schools or students.

5.19 For principals, teachers and parents, they were invited to complete a self-administered questionnaire, and return the completed questionnaire in a sealed envelope. As such, information provided by teachers and parents was kept strictly confidential and was not known to school personnel.

Gathering of qualitative information

5.20 Qualitative information required for the research was gathered from stakeholders involved in the implementation of the Scheme, including principals, teachers, students and other school personnel in the 23 secondary schools in Tai Po. In-depth interviews were conducted with principals and school social workers serving the 23 secondary schools in Tai Po. For teachers and students, focus group discussions with them were conducted at the school premises. The Project Team had also conducted focus group discussions with students and parents arranged through NGOs in Tai Po, at premises outside schools.

5.21 Needless to say, principals and teachers in secondary schools outside Tai Po were watching closely the implementation of the Scheme. The Project Team believes that it would be useful to gather their views as well, especially on future rolling out of school-based drug testing to other schools in the territory. Thus, a number of in-depth interviews were conducted with principals of secondary schools in different districts known to the Project Team to have introduced various anti-drug measures. In addition, representatives of educational organizations, School Sponsoring Bodies (SSBs), parent-teacher associations were also consulted and their views sought on the Scheme.

5.22 Other non-school stakeholders directly or indirectly involved in the Scheme were covered in the consultation process. These included members of the SDT team and social workers of CCPSA and other NGOs in and outside Tai Po, concern groups as well as representatives from government agencies. In addition, stakeholders responsible for providing preventive, treatment and other follow up services to students involved or potentially involved in drug use such as medical practitioners were also covered. With the assistance of the Hong Kong Council of

Social Services, consultation meetings were held with representatives of organizations providing school social services to schools. Finally, views of members of the legal profession and academics in the fields of children's rights and privacy were also sought. A list of organizations and individuals consulted in the research is given in Appendix 3 and the number of these organizations and individuals is summarized in the table below.

	Stakeholders involved**				
	In-depth interviews with Principals	Focus group discussions with teachers	Discussion meetings with students	In-depth interviews social workers	In-depth interviews with other stakeholders
Tai Po District	23	21 schools	21 schools	11 NGOs	2 groups
Districts outside Tai Po	9	3 schools	-	12*	23*

* Individuals and organizations

** Excluding government departments

Sampling and non-sampling errors

5.23 The Project Team is aware that data obtained from the 2008/09 survey, December 2009 survey and June 2010 survey are subject to both sampling and non-sampling errors. For sampling errors, they can be quantified. As the sampling design adopted in the June 2010 survey was a two-stage disproportionate stratified sampling design, the calculation of sampling errors would have to take into account the design effect arising from clustering due to a two-stage design and weighting due to disproportionate sampling and stratification.[14] To simplify the computation, the Jackknife Repeated Replicated (JRR) method was used in calculating the sampling errors of the survey estimates. JRR is a method that uses simulations of coefficient distributions in replicates or subsamples generated from the survey sample to produce estimates of standard errors.[15]

5.24 As regards non-sampling errors, they cannot be easily quantified. In

14 Kalton, Graham, et al (2005), "Estimating components of design effects for use in sample design", in United Nations Statistics Division, *Household sample surveys in developing and transition countries,* Studies in Methods, Series F, No. 96.

15 Stapleton, Laura M (2008), "Variance estimation using replication methods in structural equation modeling with complex sample data", in *Structural Equation Modeling,* 15: 183 – 210.

conducting the June 2010 survey, measures were in place in the questionnaire design and data collection process to minimize non-sampling errors arising from respondents' misunderstanding of the questions asked and unwillingness to provide the true responses. Pretest was conducted to try out the questionnaires before implementation. The respondents were assured of confidentiality of information related to individual respondents and individual schools to encourage frank response.

5.25 Given that a mixed method was adopted in the research, findings obtained from different methods might not be consistent. In addition, information gathered from in-depth interviews or focus group discussions might be subject to selection bias and could not be generalized to represent the views of the population under study. In interpreting the research findings, the Project Team has attempted to triangulate findings obtained from different methods. As noted by researchers, triangulation, "across method" or "within method", enabled a more holistic and contextual analysis of the phenomenon. By gathering and triangulating quantitative and qualitative information from different sources, it helped increase the richness of and confidence in the information gathered.[16]

Hierarchy of evidence

5.26 The Project Team is also acutely aware that there are strengths and weaknesses in the information gathered through different methods and has used and interpreted the information with care and due reference to the "hierarchy of evidence". Researchers noted that in the hierarchy of evidence, systematic review (which represented a comprehensive accounting of all randomized controlled trials related to the problem area) and randomized controlled trials were traditionally placed higher in the hierarchy, followed by cohort study, case controlled study (in which "cases" with the condition under study were matched with cases without the condition, serving as "controls", and a retrospective analysis conducted to examine the differences between the two groups), cross-sectional survey, case report(s), expert opinion and anecdote. Nevertheless, the hierarchy only focused on the internal validity, without taking into account external validity. External validity was concerned with whether a treatment found to be effective in a particular setting or group of persons be generalized to other

16 Casey, Dympna and Murphy, Kathy (2009), "Issues in using methodological triangulation in research", in *Nurse researcher*, 16(4): 40 – 55.

settings or groups of persons.[17] [18]

5.27 In addition, researchers also noted that in the processes of randomized control trials, only a narrow spectrum of the target group under study might qualify for inclusion in the study, implying that the external validity of randomized control trials was low. There were also legal or ethical issues preventing the use of randomized control trials. On the other hand, non-randomized control studies like cohort study and case controlled study had higher external validity and were more firmly based on real world situations.[19] [20] For the purposes of the present research, in the absence of a pre-post design, the Project Team has to rely on data on views of a representative sample of stakeholders collected in the June 2010 survey and expert opinions gathered through in-depth interviews in conducting the evaluation, achieving to a certain extent external validity in generalizing the survey findings to the entire population under study.

Data analysis

5.28 Statistics relevant to the discussions in the paragraphs to follow are presented in simple charts and tables. As the survey data were subject to sampling errors, estimates of sampling errors of estimates derived from the surveys were compiled, based on which the confidence intervals of the estimates in question were computed to serve as indications on whether any differences observed were statistically significant, when such differences were larger than what would be expected as a result of sampling fluctuations.[21] [22]

5.29 Furthermore, in analyzing the survey data, the Project Team is aware that

17 Bowe, Pete (2007), "Confronting the hierarchy of evidence", in *Healthcare counseling and psychotherapy Journal*, 7(2): 16 – 20.

18 Brighton, Brian, et al (2003), "Hierarchy of evidence: from case reports to randomized controlled trials", in *Clinical orthopaedics and related research*, 413: 19 – 24.

19 Evans, David (2003), "Hierarchy of evidence: a framework for ranking evidence evaluating healthcare interventions", in *Journal of clinical nursing*, 12:77 – 84.

20 Hoppe, Danniel J (2009), "Hierarchy of evidence: why observational studies fit it and why we need them", in *Journal of bone and joint survey*, 91(Supplement 3): 2 – 9.

21 Moser, C A and Kalton, G (1971), *Survey methods in social investigation*, p. 74 – 76.

22 Agarwal, N P and Agarwal, Sonia (2006), *Sampling methods and hypothesis testing*, Chapter 3.

many of the question items are ordinal in nature, which is very common in social research. Though strictly speaking, the usual measures of means and standard deviations and parametric tests are not applicable to ordinal data, researchers were of the view that the strictest application of rules about the use of parametric statistics for scale data would leave many researchers ill-equipped to handle the multivariate nature of most problems existing in social, administrative and clinical sciences and considered it was safe to assume equality of intervals in the scale data.[23]

5.30 In addition to estimates of sampling errors, more sophisticated statistical tests such as t-tests and analysis of variance were performed where applicable to analyze the relationship between variables measured in the study. As demonstrated by researchers, by simulating results obtained from non-parametric methods, the validity of such tests does not require any assumption of normality on the underlying distribution, provided that the sample size is sufficiently large.[24] For the purposes of the present study, given that the sample size of the questionnaire surveys was very large, parametric methods such as analysis of variance were used in the analysis.

5.31 As pointed out above, the Project Team is aware that it was not possible in the research to match the response of individual students enumerated in the 2008/09 survey, December 2009 survey and June 2010 survey, as the surveys were conducted in an anonymous manner. Besides, the 2008/09 survey and the December 2009 survey were conducted by different parties using different survey designs before the present research design was drawn up and the June 2010 survey was planned and commissioned. As a result, it was not possible to compute the covariance in the estimation of sampling errors for estimates of changes. Consequently, the variances of differences of means were under-estimated, the extent of which depended on the correlation between the two survey data and the degree of overlap of respondents in the two surveys.[25] Furthermore, because of the overlap of respondents enumerated in the 2008/09 survey and June 2010 survey,

23 Desselle, Shane P (2005), "Construction, implementation and analysis of summated rating attitude scales", in *American Journal of Pharmaceutical Education*, 69: 1 – 5.

24 Lumley, Thomas, et al (2002), "The importance of normality assumption in large public datasets", in *Annual Review of Public Health*, 23: 151 – 169.

25 The variance of the difference between two means is given by sum of the variances of the two less two times the covariance of two means. Hansen, Morris H, et al (1960), *Sample survey methods and theory, volume 1: methods and applications*, p.513.

the independence assumption for analysis of variance in comparing groups of students enumerated in the two surveys would not be met.[26]

5.32 In the study, a number of questions were asked to collate information on students' views, misconception and awareness of drugs and attitudes towards fighting drugs. Several composite measures, or the latent variables or underlying factors, were identified from the observed data using exploratory factor analysis.[27] Based on the design of the study and the availability of data, the validity of the various underlying factors were assessed by examining the convergent and discriminant validity of these factors, their reliability assessed by using the split-half method and their internal consistency analyzed by computing the Cronbach alpha.[28] [29] In addition, inter-item correlation was conducted to determine the level of relatedness of items to each of the factors.[30] [31]

5.33 Finally, as noted above, the June 2010 survey did not cover Secondary 5 and Secondary 7 students, as they had already left schools when the survey was conducted. To facilitate comparison with data obtained in the 2008/09 survey and the December 2009 survey, the survey data on students used in the present research for reporting and analysis purposes did not include those for students aged 17 and 19.

---

26 Macfie, Brian P and Nufrio, Philip M (2006), *Applied statistics for public policy*, p.343.

27 Lu, Cheng Hsiung (2006), "Assessing Construct Validity: The Utility of Factor Analysis", in *Journal of educational measurement and statistics*, 15: 79 – 94.

28 DeCoster, Jamie (2000), *Scale construction note*, Department of Psychology, University of Alabama, assessed on 21 August 2010, www.stat-help.com/notes.html

29 Santos, J Reyanldo A (1999), "Cronbach's Alpha: a tool for assessing the reliability of scales", in *Journal of Extension*, 37(2).

30 Shek, Daniel T L (2007), et al, "Convergence of subjective outcome and objective outcome evaluation findings: insights based on the Project P.A.T.H.S.", in The Science World Journal, 7: 258 – 267.

31 Faleye, Bamidele Abiodun (2008), "Reliability and factor analyses of a Teacher Efficacy Scale for Nigerian secondary school teachers", in *Journal of research in educational psychology*, 6(3): 823 – 846.