Ministry of Education and Sports Republic of Serbia
Vocational Education and Training Reform Programme

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Guidelines and Methodology
For the Appraisal and Prioritisation
Of Equipment, Teaching Materials
And Building Infrastructure Needs
For VET Schools

HANDBOOK

2005

PREAMBLE

The present Handbook was developed within the framework of the first Vocational Education and Training Reform Programme (2003-2005) for the Republic of Serbia financed by the European Agency for Reconstruction (CARDS) by the consultants of the consortium led by European Profiles S.A., who worked within the Programme Implementation Unit (PIU) of the Ministry of Education and Sports (MoES) on the two (2) components referring to the upgrade of the school infrastructure of the 50 pilot schools and the five (5) Regional Training Centres that were selected by the MoES to participate to this project, i.e.

⇒ Supply of equipment and teaching aids (Part A) and,

⇒ Rehabilitation of school buildings (Part B)

It is as important to emphasise that an important success criterion of the project as such was to secure that the local counterparts are keeping the full ownership of the activities and the pace, and that the methods developed are in compliance with the development among the Serbian players and in accordance with Serbian priorities. This aspect was taken seriously into consideration and was applied in all stages of the procurement cycle, in line with the project's aim for capacity building and transfer of know-how to school principals and teachers, as well as to the directly and indirectly involved MoES staff.

Another issue underpinning our approach was that the equipment was addressed to *existing* schools and consequently the already existing equipment and building infrastructure had to be assessed and taken into consideration in order to develop the priorities for the selection and distribution of supplies and buildings' rehabilitation needs to be covered under the given budget of the VET project. In the case of new schools a lot of necessary basic inputs like power, water supply and other installations, the size of special workshops, laboratories and ICT classrooms can be considered in advance; therefore the present Handbook applies also for such cases.

This handbook goes beyond the activities of the Programme Implementation Unit (PIU) of the VET project and aims at presenting guidelines and methodological advice on selection and procurement of ***equipment*** and assessment and prioritisation of ***building rehabilitation/re-construction works*** for schools/training institutions referring to international practices that apply to the public and private sector.

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PART A: PROCUREMENT OF EQUIPMENT AND TEACHING AIDS

1. INTRODUCTION

Since the start of the industrial revolution, production has been a key wealth creator in the economy. In the last 20 years through the technological developments in all sectors, and mainly recently, when the use of mobile communication and internet access spreads out, services based on ICT boosted immensely the high technology based economic activity. Now, more than ever, the continuous consideration and adjustment to the exciting emerging technological advancements in education is the only way to increase the possibilities of young people to access challenging and rewarding careers in their professional orientation.

Advances in areas such as process speed, precision, flexibility, efficiency, reliability and control are made possible by new technical and technological equipment and process development, which are themselves evolving rapidly. It is vital that young people should be made aware of their potential, and be encouraged to participate fully in this increasingly awesome world of technology.

The national education actors should support schools' ideas to develop specifications and recommendations for contemporary curriculum oriented equipment in schools.

2. BACKGROUND FOR THE DEVELOPMENT OF POLICY AND STRATEGY FOR EDUCATIONAL EQUIPMENT

Through this it may be expected that, with enhanced school teaching technology resources and the support of social partnership initiatives, more students can eventually benefit from experiencing real industry and production standard design, manufacturing techniques, a professional environment and the realisation of their own ingenuity.

This should lead to more young people being inspired, motivated, and better prepared towards careers in industrial production and services in the market oriented economy, as well as in civic institutions. Therefore policy and strategies need to focus stronger on well developed initiatives to promote greater general knowledge, more understanding and appreciation of the technological developments and transfer of updated skills to young people through the selection and involvement of appropriate modern technological equipment for all people in the educational institutions.

3. AIMS & GOALS FOR POLICY DEVELOPMENT – NATIONAL CURRICULUM

Since rapid technological development started in the 80's and 90's a minor revolution has taken place in teaching and learning associated with educational and didactical equipment. Access to the relatively new technologies and contemporary equipment has enabled students to more than live up to three important general aspects of the VET curricula aims, namely:

- Participate in tomorrow's rapidly changing technologies
- Intervene creatively to improve the quality of life
- Become autonomous and creative problem solvers and designers

It is now possible for schools to simulate the concept of concurrent curriculum whereby social partners and future employers can have on line access to the curricula drafts and include their comments and modifications simultaneously. The concept of concurrent education with pupils and teachers able to use contemporary equipment oriented to the labour market demands, to develop practical skills, to integrate knowledge and understanding is opening up fantastic opportunities to develop teaching and learning appropriate for the 21st century.

The world-wide technology developments which have taken place over recent years are now being reflected in many schools. At its very best, the use of technical and technological equipment has

enabled pupils across all key stages to develop knowledge, skills and processes so needed by contemporary occupational standards, namely:

- The ability to model, adapt and develop ideas as an interactive process
- The development of holistic thinking

In understanding the need for quality and precision standards, it is worthwhile noting that for many students, the use of new contemporary equipment has dramatically raised:

- Their ambition in tackling activities which are unrestricted by the acquisition of traditional hand skills
- Their educational esteem, giving some students a fresh start in the educational process
- The value of examination performance and their degree

For teachers there has also been the opportunity to:

- Reassess the notion of student abilities
- Rethink the nature of basic skills, knowledge and understanding required by students living and working in the 21st century
- Consider the appropriate progressive development of these skills across all key stages
- Develop new and appropriate teaching strategies

Any new curriculum development initiative however is leads to a wide range of challenges, that need to be met.

These challenges can be indicatively summarised under the following headings:

A. National level

• The raising of the political awareness and understanding of this important initiative and the associated financial implications of accessing 21st century technologies

• The development of new assessment, monitoring and evaluation strategies which truly accommodate both the labour market needs and the impact of new technologies on practice

• The co-ordination of the many exciting curriculum development projects taking place in schools and colleges

• Helping equipment suppliers to develop a clearer understanding of the educational needs of the users of their products

B. School level (Local Community)

- Developing the perception of senior school staff, and the local community of the importance of contemporary educational equipment to the development of the country's economy
- Prioritising the development of practical skills and student access to contemporary equipment
- Stimulating cross-phase developments to ensure progression and continuity
- Monitoring the development and nature of world-wide technology and education practice

4. GENERAL STRATEGY FOR SPECIFIC EQUIPMENT SELECTION

The main **objectives** of the general strategy for specific equipment selection are:

- The strategy must be replicable for all educational sectors in VET
- The strategy has to have form and quality to enable self-monitoring and evaluation
- The strategy has to specify appropriate items and laboratory/workshop arrangements to support the educational goals on specific knowledge and skills required of the new and/or revised curricula of the schools or training institutions.

The **content** of the general strategy for equipment selection should refer to the following aspects:

A. Curriculum review

- Review of the educational goals of each curriculum and respective occupational profile(s) by the actors directly involved in the procurement cycle i.e. key managerial and teaching school staff, any external procurement and technical experts and, in the case of sector specific school equipment, as the case of the VET project, representatives of the school associations per sector.

- If applicable, consolidation of similar educational goals in terms of targeted knowledge and skills, taking into consideration similar needs of other existing occupational profiles in the schools/training institutions within the same sector.

- Information on practices abroad in schools/training institutions in the same or similar sector with comparable educational needs.

B. Professional occupation environment screening

- Indicative review of actual production practices, labour market demand and professional equipment in companies with activities in business sectors in need of personnel with such knowledge and related skills, taking into consideration advice from representatives of the related businesses in the sectors, as well as from the social partners.

- Indication of expected technological developments in these business sectors. Such a forecast should refer at least to a medium term perspective (3 to 5 years) and if possible include evidence on expected equipment life time and reliable information on emerging new technological developments in relation to similar equipment.

C. Market research and equipment selection

- Market research for specifying appropriate equipment scale/size and use in schools (i.e. full scale professional, didactic equipment and workshop, simulation – demonstration).
- Identification of potential suppliers, examination of origin issues if necessary (i.e. EU origin rules), preparation of final technical specifications and budgeting.

D. Selection of procurement procedure

The selection of procurement procedure depends usually on the financing source and the related legislative framework and rules, e.g.

National procurement rules and regulations, if the financing is coming from the government, a national financing institution or local private donors

- International private donors or agencies i.e. World Bank and other banks, United Nations, humanitarian organisations, European Union (see EU procurement rules and regulations, EC website, Procedures and Standard Documents, Practical Guide (PRAG) for

international procurement contracts:
http://www.europa.eu.int/comm/europeaid/tender/gestion/pg/index_en.htm).

5. EQUIPMENT STANDARDS, SELECTION GUIDELINES AND CRITERIA

The initiative to promote modern curricula cannot achieve its full potential unless students have access to the type of equipment that can be used to transform theoretical knowledge into practical skills, verifying the functionality of a pupil's educational values.

In order to enable the students to use the new technologies, schools will have to carefully select and invest in new equipment and instruments appropriate for the use by students but at the same time simulate up to date job requirements. The following points below aim at assisting teachers in determining the type of equipment that will meet their requirements and provide information on the detailed questions that should be addressed before compiling the technical requirements for the specific supplies in order to maximise the chances to select finally the most appropriate equipment that satisfies the educational needs.

5.1. STANDARDS

The starting point for establishing the standards and type of school equipment is to analyse the National Curriculum and the individual occupational profiles.

In the case of the procurement cycle foreseen within the framework of the VET Reform project a number of meetings were held between representatives of the Ministry of Education and Sports – Republic of Serbia, school principals and teachers, members of the schools' associations, experts for curriculum development, advisors for text books and teaching materials and international experts on educational reform to discuss and agree on the level of equipment to be included in the technical specifications for the procurement. The baseline approach followed was to specify a range of standard equipment that provides the necessary functionality needed by all schools within the same sector to enhance the teaching of practice based subjects associated with the specific field of work, e.g. mechanical engineering, agriculture and food processing, electro-techniques, construction, health, etc.

Equipment of the type being proposed also enhances the manufacturing facilities for the school as such and complements the teaching methodology across a range of subjects. The intent is for schools to adopt standard machines that will satisfy their requirements. This approach would increase the production volumes for these types of machines. This again will reduce the price of standard equipment to a more affordable level for schools that operate on modest financial budgets.

The modern process of training supposes an adequate provision of teaching materials, laboratory and workshop equipment (equipment). The free market offers at this point in time a very diverse range of equipment for many commercial and industrial needs. The available financial resources for procuring such equipment are limited. This places a large burden on those who are charged with the task of ensuring that money is spent carefully and wisely to provide good quality training in the occupations in order to satisfy the industrial and commercial needs of the country now and in the future.

Equipment procurement should support the education process in that the curriculum should drive equipment needs rather than the reverse. Allowing institutions to have a greater say in procurement gives them greater autonomy to decide the equipment needs to satisfy the requirements of the training standards and the curriculum.

Competent staff should review the training standards and the curriculum for their area of specialisation in order to judge in an appropriate way the present and future requirements for

equipment. The responsibility for the successful interpretation of the training standards and the curriculum into appropriate and accurate equipment specifications lists should ideally be done in co-operation with the teachers and practitioners who are involved in delivering their respective part of the curriculum. In some instances there may be cases where the authors of the curriculum are the same people responsible for supervision of the delivery of the equipment.

It should be remembered that appropriate and accurate equipment specifications should be compiled for BASIC EQUIPMENT. The interpretation of BASIC EQUIPMENT in the context of this presentation broadly means equipment that will be needed over and above existing serviceable equipment to deliver training programmes for the various occupational areas and which is classified as capital intensive items. Small and lower value items i.e. hand tools like hammers, screwdrivers, saws etc. would normally be purchased by the school using its own resources.

5.2. SELECTION GUIDELINES

When deciding upon the equipment needs to satisfactorily deliver the curriculum, consideration should be given to the following selection guidelines:

a. The equipment specified should fulfil the stated requirements and relevant training standards in relation to the expressed educational needs

- Does the equipment satisfy the general and basic training needs, as well as the acquisition of the specific key skills foreseen by the curriculum and respective occupational profile and with regard to the training standards in terms of range and outcomes?

b. The equipment is of appropriate size

- Is there a requirement in the training standards and curriculum for trainees to use full-size, scaled down or didactic equipment?
- Can the required training outcomes be achieved with scaled down or purely didactic equipment?
- Will the trainees be capable of converting easily to full size equipment after training?

c. Installation within the institution

- Is there a requirement to provide additional space to accommodate new or modified (in case of upgrades-extensions) equipment?
- Can replaced equipment be accommodated in obsolete left over premises from the safety point of view or should it be transported out of the school to an appropriate location or sold (i.e. recycling, overhaul, etc.) ?
- In the case of a new or modified workshop or laboratory does the existing available space and its layout provide the possibility to arrange a safe working environment?

d. Utilities, health and safety

- Is there adequate access to the necessary utilities for the equipment and sufficient capacity (power, gas, water, waste disposal, etc.)?

- Is there adequate protection within the existing infrastructure in line with the appropriate health & safety standards foreseen for the activity planned and the equipment to be used to protect the trainees and school staff? At this point it is worth mentioning that certain health & safety issues are related to the building and its installations and need to be resolved in co-operation with the competent building maintenance and/or rehabilitation staff of the school or external experts.

e. Running costs (maintenance, service, utilities and consumables)

- Does the school/training institution have the financial capacity to support the estimated running costs of the desired equipment?

- Does the school/training institution have the necessary skills and appropriate resources available for the necessary ongoing service and maintenance following the expiry of the warranty period?

g. Readily available supply of spare parts

- Will the equipment have the necessary support from the manufacturer or supplier in terms of spare parts for a sufficient period depending on the specific equipment expected or foreseen life cycle?

h. Readily available supply of raw materials

- For the performance of certain training activities some equipment may require special raw materials. Is there a readily available supply of such materials at a "reasonable" cost or can "standard" materials be supplied locally (possibly donated i.e via co-operation with local authorities or business actors)?

i. Adequate storage of associated ancillary equipment

- Some fixed equipment is supplied with ancillary adaptations. Are there adequate and secure storage facilities for such equipment?

5.3. PRECONDITIONS AND SELECTION CRITERIA

Following the selection guidelines in 2.4.2., the following desired preconditions and main selection criteria should be taken into consideration:

A. Preconditions to support equipment use

The following factors play an important role in assuring that schools have sufficient support to overcome any possible emerging obstacles that could jeopardise the training delivery during the school period:

- Efficient use of the new equipment makes it necessary that all appropriately qualified teachers should have access to the equipment. Each teacher should take the responsibility to be trained in or to spend the necessary time to familiarise him or herself with the new equipment before use. It should be a requirement towards the suppliers to deliver appropriate and sufficient training and include the related costs in the overall price of the supplies.

- Available competent school staff should be appointed to take the responsibility and perform the duties in their occupational area to ensure the safe and efficient running and maintenance of the equipment.

- For the procurement procedure national/local authorised service availability is an important aspect to request, especially taking into consideration high value equipment i.e. CNC machines, agricultural mechanisation, milk processing plants, geodesy equipment, wood processing, offset printing facilities, etc.

- The schools should be motivated to assure co-operation with the local authorities (municipalities) and negotiate appropriate ways to be supported in relation to the following:

  - Although the cost of maintenance, spare parts and general supplies are to be the responsibility of the school/training institution the co-operation with local authorities on supplies of low value items, spare parts and consumables (hand tools e.g. screwdrivers, hammers etc., printing material e.g. paper, cartridges, etc.) if not donated, at least could help the schools to achieve a good price and quality.
  - Support in maintenance of school facilities and appropriate access to utilities i.e. power and water supply installations and costs

- The schools should be motivated to assure co-operation with the regional/local businesses and social partners and sectoral school associations to ensure support with know-how and guidance on:
    - Equipment selection, procurement, use and maintenance
    - Curriculum development/improvement in line with skills required in the labour market
    - On-the-job-training arrangements i.e. in the final year of the educational cycle and demonstration of the equipment use in professional – industrial environment and modern facilities. Therefore it is important when specifying equipment that some account is taken of the level of modern facilities that economic agents have at their disposal.

B. Selection criteria

B1. Value for money

1. Equipment must represent good value for money, not necessarily the cheapest price. Factors such as technical features, training provision, warranty conditions, service support, ease of use, and such should all be considered when selecting equipment.
2. It should be designed to be robust and durable in service, incurring minimal routine maintenance costs.
3. Equipment should operate with low running costs, particularly related to consumable items and serviceable parts.
4. The quoted price should include all the equipment needed to use the machine in the classroom, including samples of essential consumable items, delivery to site and installation kit.
5. Specific standard training requirements, the venue and number of training places, both on-site and at the manufacturer's facilities should be established and if necessary included in the price of equipment.
6. Any extra costs that might be incurred in training more teachers or instructing them in how to exploit the equipment's advanced technical features must be stated as an additional expenditure.

B2. User friendliness

1. Use standard components where appropriate, that can be easily purchased and replaced in the event of equipment failure.
2. Use readily available tooling, clamping devices, thread reels, baking trays and other consumable items.
3. Equipment should be designed to be user serviceable, with preventive maintenance being undertaken by the user following clear instructions provided in the service manual.
4. In the specification prime contractors must provide a declaration on estimated life in normal use, based upon recommended maintenance procedures. (Normal use is estimated to be 1,000 hours per year).
5. The quotation for new equipment should include a statement on the replacement price for consumable maintenance items, giving details of life expectancy and possible service charges.
6. Equipment should be safe and easy to clean at the end of a session.
7. After initial training and under appropriate supervision, pupils should be able to have personal control of the machines and equipment.
8. Equipment should be supplied with a user-friendly service manual. The equipment and manual must have consistent terminology It should be well written, with clear instructions and documentation on how to install the equipment and undertake routine preventive maintenance

tasks, including straightforward repairs.

9. The purchase price should include user-friendly operating instructions and self-training packages for teachers to learn how to operate the equipment safely. This should also include practical examples on how the equipment can be used for producing articles that fulfil requirements at different key stages of the national curriculum.
10. The purchasing price of the equipment must include the necessary control software and hardware needed to transform files of items (i.e. technical drawings) created on an existing SW i.e. computer-aided design package into another and/or in printed form.
11. Software should be supported with self-help menus that allow users to readily identify and solve common problems that might be encountered by inexperienced operators.

B3. Technical standards

1. There is the risk with some forms of equipment i.e. information technology that they become obsolete in a very short time and may no longer have the capacity to satisfy the training needs required by the labour market. Care should be exercised when specifying high-risk equipment to ensure that it has an “acceptable” life span.
2. All equipment must have a detailed product specification that defines the operating parameters and technical performance of the machine. (Equipment should be warranted against this specification).
3. Interfacing software must be suitable for trouble free installation on a range of computers and networks commonly used in schools.
4. Once set-up, when the equipment is intrinsically safe, it should be able to run to the end of the machining cycle.
5. All equipment must be designed to have short set-up and changeover times.
6. Machines should incorporate easy to operate work-holding devices.
7. The equipment as supplied must meet and satisfy all ***the national and international safety, health and environmental requirements***.
8. Lists of additional items should be compiled that are related to ***individual health and safety requirements*** that refer to the protection of teaching staff and students from the operation of certain type of equipment i.e. earplugs, safety glasses, safety boots, helmets etc.
9. All equipment must be clearly ***CE marked*** and have a "Manufacturer's Declaration of Conformity" issued with the machine. The "Manufacturer's Declaration of Conformity", validates that the product conforms to the essential safety requirements.
10. All products must conform to all the relevant European Directives.
11. Equipment must have all the necessary safety features integrated within the machine.
12. Machines must be fitted with appropriate health and environmental protection equipment.
13. The equipment should have plug-compatible hardware and software interfaces that link directly to a standard PC (Personal Computer) equipped with the appropriate software tools.
14. Suitable computer-aided design packages and machine software systems must be fully integrated, providing a seamless link.
15. Software systems must be supplied ***without*** ‘dongle’ protection that restricts multiple users of the software.
16. The equipment, where appropriate, should be fitted with self-protection devices that limit

possible damage from inexperienced operators.

17. Noise levels under free-running conditions must be attenuated to the appropriate levels needed for a classroom or in some instances a school workshop environment. However normally such data are to be found at national school building and classroom standards
18. All electric motors must stop in compliance with the CE regulations.
19. All equipment must be fitted with an accessible emergency stop that mechanically isolates the electrical supply from the machine.
20. The life of all drive motors should be rated for continuous duty cycles.
21. The duty cycle of spindle motors must be stated in the specification and fitted with thermal over-rides and/or other appropriate devices to protect them from damage.
22. Equipment must be designed to operate with minimal levels of vibration.
23. Power supply of equipment (depending on the kind of equipment in line with the planned use) should operate using 220 volts, single phase 13-amp AC or alternatively for equipment requiring high power levels should be 380 volts three phase AC or DC.
24. Service requirements and consumable maintenance items must be identified with a visible cost structure for parts and repairs. Where necessary, suppliers should offer an appropriate service level agreement based on the availability of equipment to the teacher and response time to repair defective equipment.
25. Options for updating technology and/or increasing functionality may be available for possible specification upgrades/modifications to the standard equipment. These provide experienced teachers with more sophisticated facilities.
26. Installation on site should be able to be performed safely and not require on site specialist support, unless included in the price of equipment.
27. All equipment that needs to be 'levelled' in storage areas must be fitted with suitable jacking screws to level the equipment and if required, appropriate fixing method to secure it in place.
28. Suitable benches should be available from equipment suppliers, if required. These must be robust enough to carry the weight of the machine, a suitable working height for diverse pupils using equipment, and fitted with appropriate wheels and locking devices if the machine is to be transported to different classrooms.
29. Equipment as it leaves the manufacturer should be complete, suitably packed to protect it from physical and environmental damage when being transported, and be ready for immediate installation.
30. All equipment must be warranted by the prime contractor to meet the performance specification for their particular machine.
31. All equipment should be warranted against failure in respect of parts and labour for a minimum of one year. This work will be carried out on site or by the equipment being returned to the factory.
32. Faulty equipment, which cannot be used for teaching during the warranty period, should be rectified within seven working days.
33. Companies supplying equipment must hold replacement parts for a minimum of ten years. In this period parts should be available within five working days and warranted against failure for 12 months from installation.
34. Companies offering to sell equipment must be represented by a person who has extensive knowledge of the machine and associated software systems, is fully experienced on how to operate it and is fully aware of the environmental, health and safety requirements for students using their equipment in schools.

35. It is recommended that prior to the final selection teachers should ensure that short-listed suppliers are able to demonstrate in real time how their equipment can fit within the curriculum requirements. This trial must confirm that the equipment meets essential teaching requirements.

In order to support the stakeholders in filling in the list of required pieces of equipment a typical process is shown in the next table. The table suggests the activities to be performed, the questions to answer, recommendations and results in order to be able to make the best final decision.

TABLE: Steps for equipment needs assessment of a training institution (school, adult training centre, college, etc.)

Activities	Questions	Recommendations	Outcomes
1. **Analyse how your institution should respond** dynamically and flexibly to the changing requests of the local and regional community and consult the existing local/regional development plans and the domains in which professional training is to be accomplished 2. **Consult the occupational/ professional training standards** and the curriculum and relate them to the training of the occupational domains offered by the institution 3. **List the current needs** of the institution 4. **Compare** the current needs with those in other institutions offering the same curriculum 5. **List by occupational domain the current and future needs** in terms of equipment	• Does your institution, at present, respond to the changing requests of the local and regional community? • If not, then how can your institution respond to the changing requests of the local and regional community? • Has the institution its own development plan available and formulated in line with requirements for inclusion into the existing local/regional development plans? • Does the existing equipment satisfy the present and future training needs in terms of the training standards and the curriculum? • Are the current needs of your institution being met in terms of equipment? • How well does your institution meet the current needs compared to other institutions • If other institutions are meeting their needs more effectively than your own institution, what are they doing differently to achieve this • What sources and resources will be required to aid the identification of the equipment needed	It is suggested that schools/training institutions form small working groups of curriculum/training deliverers to conduct the activities listed in column one. Each group could be chaired by a senior member of staff to make effective and efficient use of the available time. Members of each working group should be familiar with their own area of occupational standards. It is recommended that the process of identifying needs should not take an extended period of time.	A **report** presenting the condition of the equipment in the institution using the provided Template 1 below or one of similar design A **list** using Template 2 below given as a guide to show the relationship between equipment needs and the needs expressed in the training standards and curriculum

TEMPLATE 1

ASSESSMENT OF THE EXISTING LABORATORY AND WORKSHOP EQUIPMENT CONDITION

NAME OF SCHOOL _____ **REGION/COUNTY** _____

NAME OF DIRECTOR _____ **No: ON ROLE** _____

ECONOMIC AGENTS _____ **OCCUPATIONAL DOMAINS** _____

TABLE OF EXISTING LABORATORY AND WORKSHOP EQUIPMENT AND CONDITION

EQUIPMENT ITEM	BRIEF COMMENTS ON CONDITION AND SERVICEABILITY

EQUIPMENT ITEM	BRIEF COMMENTS ON CONDITION AND SERVICEABILITY

TEMPLATE 2

RELATION OF EQUIPMENT NEEDS TO THE TRAINING STANDARDS /CURRICULUM ACTUAL NEEDS

EQUIPMENT NEEDED	AREA OF TRAINING STANDARDS/CURRICULUM APPLICABLE

EQUIPMENT NEEDED	AREA OF TRAINING STANDARDS/CURRICULUM APPLICABLE

CONCLUDING SUMMARY ON EQUIPMENT SELECTION GUIDELINES

Balancing level of needs

There will be many questions an institution may want to ask itself and other related actors concerning the equipment it may require to deliver a satisfactory training programme in accordance with the Training Standards/Curriculum which is at the same time interesting and appealing to the students/pupils. What is important among many other points is to keep a sense of proportion in the demands for equipment.

Prioritisation of needs in line with available budget

The money available is usually limited and to be able to have an opportunity of being successful in the acquisition of the equipment needed it will be necessary to prioritise. The most wanted equipment should be listed first.

Attention to compatibility

If the equipment required is to be used in combination with any input or output of another piece of equipment, it is important to pay special attention to the compatibility of all technical parameters of all parts of this equipment to ensure their smooth interaction.

Balancing equipment size in line with the required scale of use

Make sure to select the right size of equipment in line with the curriculum requirements of the specific target group and needs i.e. simulations and didactic equipment for young people in schools, small scale/size demonstration equipment for colleges, small scale professional equipment for practical adult training especially if practical training on industrial equipment can be assured as on-the-job training in local enterprises and/or through local partnerships.

Maximise equipment utilisation possibilities – universal use

Try to combine where possible the use of equipment across domains or occupations to be able to use available resources more efficiently and effectively, i.e. maintenance (cost, personnel time), consumables, budget available, etc.

Remember that you can acquire financial and technical support more easily when you are compiling lists of equipment and support needs, if your demands are sensible and well justified; and if the request and plan of use is concrete and well presented with a minimum volume of documentation.

PART B. SCHOOL BUILDING INFRASTRUCTURE

1. INTRODUCTION

The physical needs of Serbia's education system after more than a decade of isolation and budgetary neglect and economic mismanagement vastly exceed the scope of easy solution. Balancing the situation of extensive physical needs for system revival there is a basis for rehabilitation of existing schools as well as for newly built school structures and their further capital maintenance.

This handbook sets out the arrangements to satisfy the government's agenda for education (Law on the foundations of the Education system) and opportunity for the local community to act according to their statutory role (Law of Local Self-Government). It also identifies the programme of investments needed in school buildings, in line with an agreed framework for prioritisation of needs, the available norms and standards and taking into consideration expected developments on future standards that will be set up for the raising demands on school buildings infrastructure.

It is acknowledged that a successful plan for school maintenance has a direct impact on the raising of student performance through its three main areas of activity: Condition, Suitability and Sufficiency.

Such impacts will include the following:

- Buildings that are not in a good condition may affect the morale and motivation of students/pupils and teachers;
- Schools that have adequate, appropriately designed teaching facilities that are equipped to modern teaching and learning standards, will ensure that students/pupils and staff have the opportunity to realise their full potential;
- All parts of the school facilities could be utilized by the local community, thereby reducing the costs for investment for school premises;
- Insufficient space in a school may lead to overcrowding resulting in difficulties for good quality teaching;
- Investment in reducing energy costs will improve the local environment.

School buildings are property, that means fixed assets, as other state and/or municipal property, i.e. buildings, land and utilities (energy, telecommunications, water supply, waste treatment, etc.). Therefore school buildings in accordance with their special nature need to be managed paying special attention to:

- their overall market value developments in the immobile property sector and in line with state rules and legislation on fixed assets (regular and extraordinary maintenance, modernisation in line with new directives for energy, waste, public health and safety),
- their special utilisation in education, i.e. keeping these premises in an appropriate and safe condition to facilitate the educational processes foreseen for each building according to the rules and regulations for educational institutions (classrooms, workshops and laboratories accommodation, including installations, ventilation, lighting, etc.)

Both of the above mentioned aspects are totally compatible in terms of building rehabilitation approaches. The chapters of this Handbook are referring to these two aspects as a whole.

2. BACKGROUND

To this end it is worth mentioning that any budget available from school external sources (e.g. national and foreign government, EU and other donor agencies) for financing is given with conditions concerning the efficiency and effectiveness of its use in relation to the needs which the financing is planned to fulfil. Therefore an appropriate justification is required to convince the

competent body authorised to manage this budget to allocate a budget line for a specific purpose, i.e. school infrastructure improvement as in the case of schools. As part of this process, the competent local authorities and the schools' management need to develop plans for the efficient procurement, management and improvement of capital assets, applying innovative and energy-efficient solutions permanently (in sufficient timing).

Capital investments constitute a key aspect of raising educational standards and ensuring the safety of students. That means that the personnel in charge of the buildings have to apply and act in line with predefined regular and ad-hoc maintenance guidelines that are normally given (by a municipal department or school management) to provide appropriate conditions for proper functioning of the facilities taking into account both educational demands and health and safety rules and regulations, i.e. protecting the buildings against earthquake, ensuring fire protection and fire escape and ultimately contributing to the improvement of the overall urban environment.

As financing needs to be programmed and can be made available to cover precisely calculated and thoroughly justified needs, the handbook ***aims at*** improving:

- the methodologies for assessment of buildings and premises,
- the criteria for categorisation and prioritisation of school building needs,
- the methods for calculation and justification of the budget required in line with the school priorities and
- the arguments necessary for adequate reporting to the decision makers (school management, competent local authorities and the Ministry of Education and Sports).

The present handbook as a final output of the activities of the PIU School Rehabilitation Unit of the VET Serbia Reform Programme can only provide non-statutory guidance (statutory guidance is to be provided by e.g. MoES, central and local governments) on areas related to improvement of school premises. It is addressed to anyone who is involved in the asset management of existing schools. It brings general advice for most types of school buildings and for both teaching and non-teaching spaces and is compliant with the recent policy documents and more specifically with the statement of the new law of Education namely that 'The School Institution shall be obliged to ensure measures, methods and procedures for the protection of children and envisage strengthening the role of Local Authorities for maintenance of the existing and building new infrastructure.

Furthermore, this handbook aims at providing a methodological platform that can be modified in line with future policy developments. The guidelines presented here were used to justify the allocation of the budget available under this Programme. They can be used also to estimate and justify any financing that might be required in addition now i.e. from private, public organisations and donors, as well as at a later stage of school development.

A financing envelope of 2 million Euro was originally reserved in the framework of the VET Reform and Capacity Building Programme for the 50 pilot schools and the 5 regional training centres for adult training. In order to be able to prepare and accomplish the tendering process related to this budget an appraisal of the overall Serbian situation on school building infrastructure was necessary to underpin the chosen approach.

3. RATIONALE FOR THE A&P (Assessment & Prioritisation)

At the start of the VET Reform Programme one of our tasks was to assess the existing school premises. The existing school buildings in Serbia comprise about 5.500 structures (with an average surface of approximately 1000 m2 per structure) and constitute a network of primary and secondary schools all over the country.

The lack of sufficient space in school premises is pronounced mainly in larger towns and in particular for secondary vocational education school buildings. Due to the lack of school surface many schools use additional inadequate premises that do not even meet minimum pedagogic

norms[1] (form and size of classrooms - min 2sq.m./pupil, mobility of furniture, illumination etc.) and hygienic-technical norms[1] (volume of classrooms - min 5sq.m./pupil, distance from blackboard – max 8m etc.).

We observed that school facilities (electrical installations, plumbing, sewerage installations etc.) are in poor condition as a result of extremely poor maintenance in the past decade. Out of about a total of 5.500 school buildings (according to the EAR Report on Towns and Schools for Democracy Report):

- 25 % are over 60 years old;
- significant refurbishment is required in a large proportion of schools (the number of schools requiring refurbishment fell from 50 percent to 35 percent thanks to the support of the European Agency for Reconstruction, government investments and other donors);
- more than 25 % of schools do not have an adequate sewerage system;
- more than 50 percent do not have an adequate water supply;
- nearly 25 percent have heating system problems.

The A&P should cover all significant capital and revenue spending on school premises. Sources on funding to meet the needs of priorities identified through the A&P process should be derived from a number of sources including:

- Local authority's own resources;
- Government initiatives;
- Funds from the Government budget allocated for new schools;
- School capital funds including revenue budgets;
- Private finance initiatives (parents, etc).

The A&P should be prepared using working groups with participants from the school(s) and local authority representatives and professionals from competent municipality departments. In recognition of the wider implication for the A&P and capital investment all documentary evidence must be endorsed by the Ministry of Education and Sports.

The A&P is a document which should be updated on an annual basis and refer to a five (5) year planning period. The delegation of this duty has to be carried out taking into account any possible future local government re-organisation. Also the A&P process should be supported by training seminars for working group members for helping them to comply with their new responsibilities.

3.1. AIMS AND OBJECTIVES

- ***AIMS***

The aim of A&P is to set out information needed, and the criteria used in order to enable decisions about spending on school premises which will:

- Raise the standards of educational achievement;
- Provide safe, sustainable and energy efficient buildings;
- Ensure efficient and effective management of new and existing capital assets;
- Provide innovative design solutions which reflect the future needs of ICT based education;
- Increase Community use of school facilities;
- Maximise value for money.

- ***OBJECTIVES***

The main objectives of A&P are to:

- Provide a basis for making decisions on spending priorities, with a consensus obtained on the prioritization criteria;
- Assist Principals on school level in developing plans and coordinating different needs for investment;

[1] Official Gazette of the Republic of Serbia-Educational Gazette, August

- Assist local Authorities in using compulsory competitive transparent tendering and ensure that they seek Efficiency, Economy and Effectiveness, that is best value in delivering local services;
- Compile lessons learned, disseminate know how to extend practices to other categories of schools.

3.2. SCOPE OF A&P

- Identify local stakeholders involved in infrastructure maintenance and the related National counterparts and form expert working groups;
- Assess existing policies and laws in relation to building management at Municipality level;
- Based on rehabilitation activities, complete assessment where buildings do not meet safety criteria and educational needs;
- Prepare and agree with the National Authority on a framework for training local stakeholders in collecting information, developing policies, priorities and action plans as part of their statutory role;
- Liaise with National Authorities to compile and disseminate methods for efficient and effective use of assets.

3.3. ROLES OF RESPONSIBILITIES

The National Authorities will have overall responsibility for preparing the A&P which they should develop through partnership with Local Authorities and schools. The A&P needs to reflect the needs and priorities of individual schools and take their development plans into account. The National Authorities will have strategic objectives which might not always match the perceived needs of individual schools. In such circumstances consultation across all schools will be important to reach a consensus.

Specific roles and responsibilities of the respective parties would include:

- ***Schools***

1. Achieve the identification of school priorities and preparation of outputs (physical and educational),
2. Co-operate in the preparation of the A&P.

- ***Local Authorities***

1. Develop policies, priorities and action plans and plan the annual investment programmes;
2. Compile and disseminate information related to school buildings;
3. Promote local partnership;
4. Explore different funding mechanisms;
5. Plan, budget and manage projects;
6. Carry out some monitoring of service delivery.

- ***Ministry of Education and Sports***

1. Provide a policy statement and framework;
2. Set priorities and criteria at national level;
3. Collaborate closely with working groups on local level;

4. STAGES IN DEVELOPING A&P

This part describes the main stages in the A&P planning process. The process can be divided into six distinct stages:

1. Local policy statement (Identify roles, responsibilities and scope of plan);
2. Assessing existing premises (set up the database and compile basic data on each school);
3. Identifying needs (Consider situation, sufficiency and suitability needs and identify areas of concern, consider Authority Plans and School Development Plans);
4. Determining priorities (Develop overview on priorities, prioritize most urgent and serious needs);
5. Feasibility studies (Establish feasibility of potential solutions to priority needs, appraise options and establish economic and effective proposals, investigating funding and procurement arrangements);
6. Implementation, review and evaluation.

4.1. LOCAL POLICY STATEMENT

Local Authorities will need, in consultation with representatives of schools, to produce a statement setting out the framework of respective roles, responsibilities and functions within which the A&P would be developed.

It should cover:

- The scope of the A&P;
- Roles and responsibilities of Local Authorities and other partners;
- The basis on which information about premises will be collected and analyzed ;
- The priorities of the Local Authority;
- The criteria for prioritizing needs on the basis of agreed priorities
- The basis for maintaining and reviewing the A&P.

4.2. ASSESSING EXISTING PREMISES

- **Collecting information (Condition survey)**

Accurate information on the premises is essential to enable the development of a successful A&P. This will include information on location, details of ownership, the size, capacity and type of buildings, the number of pupils, running costs and asset values. It is essential, however, that in gathering data, clear priorities are identified at the earliest stage in order to concentrate on gathering the minimum of information for maximum usefulness.

The information gathered will help to prepare strategies for improving the use and performance of existing assets and maximizing value for money.

Establishing the condition of all school premises within each Authority is necessary to enable repairs and maintenance works to be costed, prioritised and planned.

The surveys should identify the work necessary to bring premises up to a serviceable state of repair and the information will help to inform strategic decisions on larger scale programmes of repair, replacement or improvement of premises.

- **Property information system-Asset Register**

The development of an adequate premises information system is central to good management and planning. It will enable the key factors in decision making-both needs and available resources. Computer applications can now enable data to be assembled and manipulated with relative ease.

4.3. IDENTIFYING NEEDS

The investment in school premises can be categorized broadly in terms of condition, sufficiency and suitability as follows:

Condition needs focus on the physical state of premises to ensure safe and continuous operation that may involve building regulations. It has direct impact on educational standards and provides a safe, warm and dry building with a stimulating and attractive environment. Legislative change and rising safety standards also provide challenges such as the statutory requirements associated with access for those with disabilities, safety glazing, asbestos etc.

Sufficiency needs focus on taking account of the demands of other services e.g. community use. In considering sufficiency needs Authorities will want to think corporately about use of assets. For example, can the school building be used for other purposes such as community or private sector? Sufficiency focuses on total areas and on the quantity and organization of places within schools. The primary aim of sufficiency assessment is to offer a fair and consistent method of identifying any surplus or deficit of pupil places in relation to the demand.

Suitability needs focus on the ability of premises to meet curriculum needs. Priorities concerning the premises should relate to the priority needs and their improvement must follow the rising educational standards.

Curriculum analysis and modelling should be employed where appropriate to check that the numbers, types and sizes of teaching spaces are appropriate to the student/pupil numbers and curriculum.

They should cover:

- Efficient space planning to meet curriculum needs;
- Increasing use of information and communication technology (ICT);
- Facilities capable of delivering a modern curriculum;
- Remedy health and safety problems;
- Environmental impact;
- Address functional problems with internal spaces;
- Modifications to encourage community use of schools.

4.4. DETERMINING PRIORITIES

The most important and sensitive task is the prioritisation of the most serious and urgent needs.

The Authorities will need to include in its policy statement the methodology to be used for determining priorities and it will need to ensure that the methodology has the full support of the schools.

4.5. FEASIBILITY STUDIES

Having prioritised the needs, the Authorities will have to do feasibility studies and consider the costs and benefits of alternative solutions and look at the best way of funding them.

4.6. IMPLEMENTATION, REVIEW AND EVALUATION

- ***Implementation***

Its purpose is to:

- Identify works required to maintain the use and value of premises;
- Programme the repair and maintenance works to maintain a specified level of performance, to ensure minimum disruption to the operation of the school and to match forecast levels of funding;
- Provide a tool for budgeting and financial management;

- ***Review***

This will require reprioritisation of projects, identification of new needs etc.

- ***Evaluation***

This will involve determining how A&P has contributed to improving the quality of capital management and to raising educational standards.

- ***Appraising A&P***

The approach to the appraisal of A&P would cover the following:

- Quality of data:
  - Premises information;
  - Demand data (e.g. forecast of number of students/pupils);
  - Surveys.
- Performance:
  - Matching supply and demand for places;
  - Outcomes compared with plans and targets;
  - Impact on educational standards.
- Track record
- Effectiveness of repairs and maintenance

5. MANAGEMENT PLAN

5.1. PROPERTY INFORMATION SYSTEM

The development of an adequate property information system is crucial to good management planning because it will enable the key factors in decision making, needs and available resources, to be brought together in an integrated way. Computer based systems are now available that enable these types of information to be gathered, stored and analyzed.

Many Authorities already have systems that can meet many of the requirements of the A&P. In such cases the National Authorities will need to decide whether to integrate A&P with the existing system or to invest in a new system (National Authorities may wish to develop A&P database systems that serve more than just the education service).

For the system itself it is essential that information can be extracted easily from A&P and that security is managed appropriately.

5.2. DATA ON SCHOOL PREMISES

Adequate premises data on all schools in an Authority's area is central to the development of the A&P.

The basic data requirement is as followed:

- School ID number;
- School name;
- Number of sites on which the school is located;
- Number of blocks forming school buildings;
- Gross internal area;
- Teaching area;
- Number of classrooms, workshops and laboratories.

5.3. CONDITION ASSESSMENT

Establishing the condition of all school premises within each Local Authority is necessary to enable repairs and maintenance works to be budgeted, prioritised and planned and to provide a basis for developing a long-term maintenance programme.

The condition assessment should describe all elements of the property and not just those where work is necessary (items that are in need of repair or replacement will be entered into a data base

and items in good condition where no work is required can simply be described in text). Premises should be assessed block by block, element by element to collect information on:

- Type of premises;
- Grading of the existing condition;
- Priority grading;
- Average costs to repair or renew.

Major elements and sub-elements and their classification:

- Roofs (flat and pitched: structure, coverings and insulation, drainage);
- Floors and stairs (structure, screed and finish);
- Ceilings (ground and upper floors);
- External walls (structure, external and internal finishing), windows and doors (framing, glazing, ironmongery);
- Internal walls (structure, finishing), doors (framing, ironmongery);
- Sanitary services (toilets, fittings, waste plumbing);
- Mechanical services (heat source and equipment, heating, distribution, ventilation);
- Electrical services (power, wiring, fittings, lighting, fire alarms, intruder alarms, lightning protection, communications systems).

Premises type is usually classified in condition survey reports as follows:

1. Pre 1918;
2. Inter war;
3. From 1945-1961;
4. Post 1961;

The **condition** of each element should be assessed using the following recommended grades:

1. Grade A-Good. Operating efficiently;
2. Grade B-Satisfactory. Exhibiting minor deterioration;
3. Grade C-Poor. Exhibiting major defects;
4. Grade D-Bad. Serious risk;

NOTE: A major element may cover a number of sub-elements of varying condition grades. In such cases the major element will reflect the average of the sub-elements.

The following **priority** grades are recommended:

1. Priority 1. Urgent work that will prevent high risk on health and safety matters;
2. Priority 2. Essential work that will prevent serious deterioration and medium risk on health and safety matters;
3. Priority 3. Desirable work;
4. Priority 4. Long term work.

NOTE: An element graded condition D will not always match priority 1 (where element is in poor condition but for which maintenance work is not high priority: where elements face future redevelopment, disposal or demolition, adaptation or rationalization).

An estimate of **costs** should be made at the time of assessment of the cost of repairing or renewing defective elements for bringing the element to Grade-A condition.

REFERENCES:

- LAW ON THE FOUNDATIONS OF THE EDUCATION SYSTEM (July 2003);
- NORMATIVE DEEDS FOR SPACE, EQUIPMENT AND TEACHING AIDS (Official Gazette of the Republic of Serbia-Educational Gazette; No 5, issued on 16 August 1990);
- CONSTRUCTION LAW (June 2003)

TABLE 1: Questionnaire for self-assessment (schools)

1. PROJECT IDENTIFICATION

School Name:		**No.**	**00**
VET Sector:		Ref.	
Address			
Contact: **Contact person(s), Title, Tel/Fax, Email**			

No of Pupils:		**No of Teachers and management staff**	

Municipality:		**Region**	
Address			
Contact: **Contact person(s), Title, Tel/Fax, Email**			

2. GENERAL TECHNICAL DATA

Year Construction	
No. of Buildings	
No. of Floor	
Type of Construction	
Existing original drawings. Y/N	
TOTAL "NIFA" Area[1] (m^2)	
Classrooms **(No. and total area)**	
Laboratory **(No. and total area)**	
Workshops **(No. and total area)**	
Toilets **(No. and total area)**	

[1] Net Internal Floor Area (NIFA) – Net usable area measured to the internal finish of the external walls.

3. EXISTING CONDITIONS OF THE BUILDING

NOTES: Please describe the existing conditions of each item. Refer to the obligatory norms and regulations applying to Serbia.

Watertight construction	Existing conditions of roof, thermal insulation, guttering, external openings (doors, windows). Safety regarding the quality of roof material (presence of asbestos)
Heating and ventilation	Existing conditions of heating installations, gas supply and/or fuel storage; Ventilation in toilet facilities and educational premises.
Sanitation and water supply	Existing conditions of toilet facilities. Adequacy in terms of standards i.e. ventilation, equipment, number of toilet facilities versus number of students; Sewage and/or septic tank; Water supply and distribution, safety regarding the quality of pipes (presence of lead).
Electrical installation	Existing conditions of supply; distribution panels; safety of power points and lighting; Earth bonding protection, Lightning protection.
Disabled persons access	Existence of disabled persons' access i.e. ramps, handrails; adapted toilet facilities.
Fire protection	Existing conditions of fire escapes, Fire sectioning, alarm, Emergency lighting, Fire hydrant; Proper signage; Fire protection means (i.e. fireproof doors etc.);

4.

REHABILITATION WORKS REQUIRED

NOTE: Please define the expected works limited to the categories as laid down in the table "existing conditions". If you already have a detailed description including technical specifications and costs, please attach a copy to this questionnaire.

Rehabilitation Works	*Description of the works required*
Specific VET requirements	*In addition to rehabilitation works, indicate any special needs related to the specific premises: Required IT related installations, specific electrical installations, specific flooring, painting, ventilation, fire protection, requirement for internal re-arrangement of rooms or other needs (pls describe):.*
Maintenance	*If relevant, requirements for adequate building maintenance tool kits and training; Requirements for sufficient spare parts and storage facility arrangements.*

5. EQUIPMENT REQUIRED

NOTE: Describe for each category the list and quantity of the required equipment. If you have already a detailed description including technical specifications and costs, please attach a copy to this questionnaire.

IT and reproduction equipment	Computers, software, LAN equipment, Scanners, Printers (laser, inkjets), Digital cameras, Copiers etc.
Presentation and teaching equipment	Overhead projectors**,** Laser beam projectors**,** Screens**,** Flip over charts, White and/or black boards etc.
Laboratory & workshop equipment	Measurement equipment**,** Tool kits, machines (electrical, mechanical, optical, medical etc according to the specific sector)
Consumables	Paper for copying, print outs**,** Transparencies for presentation**,** Cartridges for printers**,** Blocks for flip over charts**,** Floppy disks**,** CDs RW, etc.

6. COST ESTIMATE in Euro

NOTE: Please fill the table below only if you have an accurate estimation based on technical documentation

Rehabilitation works	
Specific requirements	
Maintenance	
TOTAL REHABILITATION	

IT and reproduction equipment	
Presentation and teaching equipment	
Laboratory & workshop equipment	
Consumables	
TOTAL EQUIPMENT	

Total Overall Cost Estimate	**Euro**

7. OTHER COMMENTS

Indicate here any additional information deemed relevant to justify the emergency of the required works and equipment acquisition.

8. PHOTOGRAPH ANNEX

Insert here photos of the school and if relevant, photos of the major problem to be addressed through the rehabilitation works.

REVIEW TEAM

NOTE: signature of the Director is mandatory, other working group members may be indicated if relevant.

Working group	Names	Signature
School Director		
Municipal representative		
		Date: