

**An Instructor's Handbook  
To  
Teaching Computer Science.**

BasicEdu Team.

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## Vision

### Modernizing Education

Education has benefited from the inclusion of technology and computers by making it easier for students to keep up. Computers help in strengthening grammatical skills and also helps in looking up information on websites than juggling through thick textbooks.

### Improves Performance

Children who use computers are steady and also perform better than who do not make use of computers. It helps in getting more focused on work at home and collaborate with other people who can help as well.

### Learning Job Skills

Teaching children how to use computers will help them in getting prepared for a number of career options. Classes should include teaching about Microsoft office suite, programs, creating presentations and data sheets, which will help them in the long run and also teach them any number of programming languages such as C++ or Java.

### Efficiency

Computers make the learning process a lot more simple and efficient, allowing them to access tools and methods of communication unavailable offline.

### Research

Technology has made research far easier than in the past. Today all books are available online for reading and no one has to look for the same in libraries or buy them. The internet has grown which has made a number of research options available. Students can research on topics in minutes rather than the hours.

It is our part to create such content that will help each and every child to read and understand how to use everything on a computer, starting from the very basics. It is important to provide them with the resource to learn and grow. This can be done by writing tutorials which will be in-depth and simple for them to walk through, and better if it is visual with diagrams which will help them in understanding better.

## Understanding the target audience and their gauging skill level.

Students need an education which will prepare them to be successful in this ever-changing technology world. Students do not see, recognize or understand what they have to learn until teachers can translate the learning intention in a developmental, student-friendly way. It is difficult to teach students with different learning abilities. However, to make learning to the students having different abilities easier, it is important to prepare and present such materials which will engage students on all levels at the very same time.

Teaching students with different learning abilities involve having creativity, time and the desire to understand how can the student learn best. It is with the help of right tools that the teachers can reach the students no matter how different the learning is.

Let us see what are the different approaches that one can take up to address the students:

- **Assessments -**

One of the best ways to start is assessing the students both formally and informally. In a classroom can be full of children of the same age, but their learning capability will always differ in the broad spectrum. Some students might learn better visually and some might with audio. Some might read exceptionally well but others not so good at learning. Conducting assessments is a way that will help teachers identify a student's individual academic skill, learning style, and interests.

- **Differentiated Teaching -**

Once the teacher has an idea about the student's skills and learning ability, one can start planning the curriculum and activities. This is described as differentiated instruction, which generally involves teachers planning for students with different skills. The aim is to create the best learning experience for students.

To ensure that everyone in the classroom participates and learns equally, one can devote some time in shaping the environments and planning each session of class. Furthermore, it is important to keep in mind the way the teacher interacts with the students, communication is the key here. The goal is to create an environment that will inspire students to participate and have the opportunity to learn, where the student can go to depths and explore issues from his viewpoint. The teacher has to create conditions that will enable the students of various learning abilities to contribute more and learn along with others. One has to take extra effort to encourage students to speak up and give each and everyone, the attention they need.

## Establishment of definitions and good practices.

### VISION

First there must be a vision that one should have to follow. The vision communicates to the community and the students about what are the organization's beliefs. The vision is generally described in one or two phrases. By developing a vision statement, you make your statement clear to the greater community as well as to your own participants and volunteers.

### MISSION

Developing mission statements are the next step in the action planning process. Be it be any organization, it is very important to make a mission statement that describes what the group is going to go forward with and what is being done. Mission statements are quite similar to vision statements but are more concrete and action-oriented.

Some general statements that mission statements should have are:

- Concise – It should not be as short as a vision statement but should have its point cleared in one sentence.
- Outcome-oriented – The mission statements should explain the outcomes of the organization that it is working to achieve.
- Inclusive – It is important to keep the mission statement very broad and not limiting it to certain strategies.

### OBJECTIVES

The next step is always focusing on achieving the mission that one has declared. The next step is to have a specific objective. Our objective is that we provide the students with the education they need. It is more focused on how and when will the mission be accomplished.

There are two basic types of objectives are

- Behavioral objectives – This objective looks at the behavior of the people, which says about their actions and the result of their behavior.
- Process objectives - These are the objectives that refer to the implementation of activities necessary to achieve other objectives.

## STRATEGIES

The next step is developing your strategies. Strategies explain how the initiative will reach its objectives. The strategies range differently from the very broad to very specific which is aimed at certain defined categories.

- Providing information and enhancing skills
- Enhancing services and support
- Modify access, barriers, and opportunities
- Modify policies

This strategic planning will help in defining the goals and the ways that one can meet them and bring definite changes.

## Understanding the underlying Logistics.

The focus should always be on the topic or the subject matter that is being taught. Students should be focused on learning about something during the lessons, and the subject could be anything from a serious topic to their favorite star. The students learn the subject using the language that they are trying to learn and not their native language, which develops their knowledge and linguistic ability in that particular target language. This is a natural way of developing their language ability.

There are certain ways of creating content that would interest students:

### 1. Preparation

First one has to choose a subject that interests the students. One can search for suitable sources that have different aspects of the subject and it can vary from audio, video, books, websites or lectures.

### 2. During the lesson

The teacher should divide the class into small groups and then assign them to do small tasks with some hint that would help them complete the assigned work. Groups should be changed every time so that it allows them to team up with everyone and develop interaction among all.

There should be an end result of this task like preparing a report or presentation which will help others know how everyone has approached the task.

### **The associated advantages.**

- It can make learning a more interesting and motivating. Students can use the knowledge gained to fulfill a real purpose, which can make students both more independent and confident.
- Students can also develop a much wider knowledge of the world through this process which can feed back into improving and supporting their general educational needs.
- It will allow students to use different resources available at hand with them, which is how they will develop valuable thinking skills that can be transferred in other subjects.
- The inclusion of a group work task within the framework as stated above can also help students to develop their collaborative skills, which can have great social value.

In this way, they will learn and grow at the same time.

## **Creating challenging and thought-provoking assignments.**

Assessments are used for a lot of purposes in the education system, it is by which the student's effectiveness and utility are judged to an extent that promotes student learning. The aim of assessments should be to educate and also improve the student's performance and not solely based on auditing it. Assessments should be created as such that the student can gain important and useful information from every single one of them. An assessment's effectiveness depends on how it is improving the learning and the relationship to curriculum and instruction.

Class tests are always focused on questions which goes like "Define this or define that", but that only makes the student memorize the context, not understand it. Assessments should be designed in such a way that it focuses more on analytical and reasoning, something which will provoke the student to think, understand and then answer. That defines how well the student has understood a concept, and if he/she is capable of answering questions based on the same. Today we do not need students to memorize the textbook, but we want them to think logically, as that what comes to use.

We all grow up in schools learning that mugging is the way to score and that is not entirely our fault but the way the curriculum and assessments are designed. The aim should be to change that notion to drive students to just "score". We need students to learn and also have

fun learning. The idea is to focus on making assessments interesting for students which they will want to solve, by giving questions that challenge them, as that is how the student will go beyond his limits and solve a particular question. That is how they will assess themselves, and come to a conclusion on which areas they should improve.

## Feedback

The most important task, in the end, is to implement what is planned out. As our mission is to make technology-enabled education a reality, incorporating that idea is required. Computer education plays a vital role in everyone's life. It is important that each and every child knows how to work with computers. The goal of technology-based education is to make the children better thinkers, creative and confident. Providing them with the hardware is the mission but also teaching them how to use is vital.

## Evaluating Student Performance

When a given student has just been introduced to a computer, existing tests evaluating familiarity with the interfaces aren't reliable since they're too advanced even for basic understanding. Instead, we use another set of tests to monitor individual student performance and progress :

### 1. **Holoalphabetic sentence testing :**

Students must open the notepad on their computer and type out

“ A quick brown fox jumps over the lazy dog”.

We prefer timing the time required for :

1. Understanding the problem statement
2. Navigating to the notepad
3. Typing the required text.

Normalising and graphing these times taken are an accurate representation of progress.

### 2. **Motor skills Testing :**

Although somewhat crude, this test requires the students to draw a graphic on paint.

Experimentally, to standardise the judging of this procedure, we created in-house deep learning models that grades the drawings within a range of 1 to 10 in terms of accuracy and resemblance.

### 3. **FOR ADVANCED STUDENTS :** Real life job tasks including responding to emails, data entry and typing out written documents are provided to the students. ( Custom grading )