CHAPTER 4
ANALYSIS OF DIFFICULTIES IN OOP & TO STUDY
UNDERSTANDING PROBLEM OF OOPS TO STUDENT
AND TEACHERS
4.1 Difficulties in OOP

The difficult task for students is to understand object oriented concepts. Also, for lectures or teachers to teach these concepts similarly challenging. These concepts from the decade teachers used different methods to teach. Sometimes authors check the outcome of class exam was analyzed to select the several areas students having difficulty in understanding. In our research to overcome difficulties in OOP to students to develop used the tools. They mostly concentrate on those areas of object oriented programming with the help of result and design course material that needed. Some research shows that there are lots of difficulties teachers faced to teaching programming concepts to students. The concepts like classes, friend function, constructor calling, overloaded constructors, abstraction, polymorphism and OOP other concepts are difficult to understand students. They find it a somehow hard to transform or convert to object oriented programming having the students who have background to procedural programming. The students taking much time to understand these OO concepts. In object oriented programming single program number of classes exist[1]. We consider object oriented programming like java is more popular both industry and academia. Now a day’s Large amount usage of object oriented across world programming. Industry need between wide edge and knowledge of students in Object oriented programming. The greater responsibility of teaching and learning object oriented programming in academia. There is some conditions occurred that overcome the less performance object oriented concepts is identified the nature of difficulties. Students that have important knowledge and object oriented programming skills structure(OOPs) with C++, learning these concepts using java programming is difficult task for average students due to understanding problem of OOPs concepts. The additional skills that are higher level of abilities as polymorphism, abstraction, encapsulation and inheritance. Learning of Object Oriented Programming with the use other programming languages is difficult task and it needs lots of skills and better knowledge. For the better understanding the collection of data analysis difficulties of Object Oriented Programming. The students have learning difficulties on different terms including the Object Oriented Programming principles in data analysis. Some authors teaching techniques to next research for Object Oriented Programming and some ways to change the Object Oriented Programming learning ways [19].

The challenging task is one in computer is teaching Object Oriented Programming like java. There are plenty of reports; each represents hardness or
difficulties in teaching or understanding and learning object oriented programming. Some authors find that the various factors in learning hardness of object oriented programming course for teaching programming with some objective such as difficulties while learning programming and some terms that lead to poor performance in programming subject. The students will occur difficulties in their understanding until they know about programming stored in memory and instance relate to one another; Because of absence of pointers also they find object oriented programming concepts difficult. The authors suggest some problems with java such as keywords, syntax and input and output and no help available. The researcher has finding for different ways in learning and teaching OOP, java due to certain challenge. The object interaction and object visualization are the key elements. The concept on which object oriented programming based is object as an entity or instance of class or thing whose identity persists. The programmer’s point of view object concept is meaningful, useful and flexible organizational device in the analysis, maintenance and design of complex systems. Inheritance is most important principle of OOP, which has resulted in significant achievements. On polymorphism and subtyping the important semantics work can be performing. The working is performing on models subtypes and polymorphism on the basis of OOP. For the better understanding of interaction and local state is the part of object. Here object oriented programming basic issues are discussed. Object oriented foundations are explored by object based languages. The object based languages used the recent results validate including functions and classes can be represented as objects types. Object based are the basic build for easy, flexible and powerful as choice and object oriented programming is foundation. Also, java is pure object oriented programming provide mechanism for running and stopping threads. The interaction of thread via shared memory and synchronization via using the mechanism of exception handling and return statement. The threads and memory must follow the interaction with the notion of event space.

4.2 Hiding Data

The creation of design is shifted from design of programs to design of procedures points to the organization of data. Program size is increase when the above designs are converted. A module can be defined as a set of related procedures with the manipulated data. The data is hidden in modules with the use of programming paradigm decide module and partition the program. This data hiding principle is a
given paradigm. The procedural programming style is sufficient even related data are no grouping of procedure. The technique for designing better procedures is applied to every procedure in a module. Here, we take example of a stack module definition.

The technique for designing better procedures is applied to every procedure in a module. Here, we take example of a stack module definition.

The good solutions for the given problem are: a user interface for the stack is available as methods push () and pop (). The stack is providing initial values before its first use.

```c
// the module stack of characters interface can be declared as
const stack_size = 00;
char pop();
void push(char);
stack.h file can store the given interface and the other parts can be defined as…
#include "stack.h"
static char k[stk_size];
static char* pt = k; // Stack value is empty at start
char pop()
{
    // conditions check for pop and underflow
}
void push(char ch)
{
    // conditions check for push and overflow
}
```

A linked list can be used on place of stack must be quite feasible change. The access of representation must be prohibited to the user. Here k and pt are defining static that is local to the file or module [25].

A stack is used as like this:

```c
#include "stack.h"
void function1()
{
    char ch = pop(push('c'));
    if (ch != 'c') error("impossible");
}
```

If method for name hiding the remaining code is makes it local to procedure this function does not provided Pascal. It helps to different procedure nesting and global
data is important. From the example C is different because a module is collection of related function and data definitions collected in single source file. Using C degree of modularity can be achieved. Static declaration is used for there is no needed format.

There are many studies that points to the learning of central concepts by student are better acquisition of central concepts from Object Oriented Programming. At the starting stage of programming education that type of concepts are needed. Sometimes student done their programming assignments on his own way but students create their own meaning and it not sufficient and gaining partial knowledge that complete and accurate information does not gain. For understanding of programming concepts need to understand theoretical definitions and also try to understand formal aspects. The practical knowledge and understanding of concepts must be needed, and these two are interconnected. There is need of learning types for object oriented programming technology.

4.3 How learn to program understanding by students

The meaning of learning program can be find in previous studies this question must be arises to students at the time of understanding. Some authors studied experience of what it means and what it takes to learn program of engineering students. The researchers investigated experiences of students for learning to program they uses different techniques by first year students. Here both shown that detail understanding of what learning to program means is essential to students

4.3.1 Resources uses by students

The journals articles and conference papers are containing resources for learning to program are mentioned. The resources can be utilized by the students in the present study and also used for computer science education community. Then after, they studied on related work on the resources used in study. The problem based learning used technology supported resources like collaboration methodologies and programming tools and also pair programming collaboration. The compilers are used in present study by students within technology supported resources. Some of the students used for finding information use internet as a resource and some prefer software development environment for the course study. Some of the students said that collaboration as essential resources in learning.
4.3.2 The difficulties to Learning and understanding Programming languages but Learn using thinking

The Learning a way of thinking is experienced to learn program. The learning is very difficult to take and difficult to understand with the programming language. To express how to learn program at that time common way is used and express in the form of programming thinking and what is missing understanding of programming. Some of the students actual thinking about programming as special thinking and required special ability to program. There is most of students have to identifying thinking of programming problem is present and also some express as it own knowledge or his own logic. It also to understand some programming languages learning to program are used and its past details are used. When you program there is need of actual thinking to understanding. The main focus on the essential thinking that is required to programming is discusses student. There is most important part understanding programming language but also, logic and some skills behind language. When that type of knowledge acquired by students then they differ between human and computers as some special points to learning of programming. The way of thinking about program differences are matter here, because computer code and how it is interpreted, and also human beings thinking. The logic is word used think about to learn to program and discusses with each other. It is possible using thinking itself; it is creating except than specific command and how it is understand and it is depend on logical thinking. When the issue of programming comes you should know to thinking. Sometimes it is needed to be detailed about to program and how the computer works or the software. The syntax of the programming language are create problems for logic. How you make things work sort and understanding things, putting together. There is many ways to reach your destination or aim. Some students express that it difficult to know how to construct a program, problems in knowing how studying and to understands concepts. Thinking about programming is another type of magic. The programming is very difficult task to understand but some people just understand programming and it should use different things in program. The students or learners who have been programming before, they have been learned to think. The differences between student or learner’s logic, capabilities and computer with its compiler are most problematic factors to think students about programming language. The programming is come across in the everyday life that student talk with each
other. If you want to learning to program then everyday life computer programs understand and this understanding utilized [29].

4.4 Parallel Object Oriented Programming current state

In the recent year’s vast amount of research attended in the last ten years in the area of parallel Object Oriented Programming. There is vigorous number of Object Oriented Programming languages have been draw up, tested and implemented to similar applications. In parallel object oriented programming stages there is lots of issues and difficulties are present. The parallel Object Oriented Programming (OOP) languages are adjustment in area like capability of inheritance, memory utilization automatically, heterogeneity, capacity, debugging and ease of use.

a. Capability of Inheritance:

The objects which can be divided in a network and which doing work to handling and accept messages one after another such exploration fails some languages to provide inheritance. Some languages permit base of inheritance only inheritance of single classes. There is most of languages are poor to providing inheritance for code of parallel objects synchronization.

b. Capacity and ease of use:

Parallel Object Oriented Programming covers various C++ extensions experimental languages. These extensions are very big and complicated, and that is why it’s not easy to learn, implement or use easily. The interpretation oriented languages also includes like java, Smalltalk and so on, they does not provide high run time capacity and efficiency of type checking.

c. Heterogeneity:

The computing environments nowadays are becoming plenty off heterogeneous. Different platforms have access by users within PCs, workstations and they are networked locally or distributed geographically. The most object oriented programming languages build for consistent networks or aim for at exact elevated performance platforms. The conversion can be take place between heterogeneous network OO computing environments that type of compilation oriented languages not available.

The strange of the exact architectures are pellucid for the user. The difficult points of object oriented programming can be handling by researchers using different
approaches. Suppose we consider an example famous serial object oriented programming building new object oriented programming parallel language and also parallelizing compilers versus explicit parallelism. The displacement from a regular language to its parallel change would be easier and minimum strange than the displacement to newest language is mark. The new language designed from claw is not better than the consisting language having same extension. Rewriting a new language for learning l lac line program is not problem. Parallelism and combine objects number of proposals has two designs. The first one is built in parallelism from a new parallel Object Oriented Programming language. The second one is improve it with analogical mechanism within existing Object Oriented Programming language. Nowadays latest proposition follow the second approach. The programmer is capable of giving parallelism in explicit form and researcher assumes that the programmer is interested in that form. The real world objects may present and do things sequentially and also Object Oriented Programming means programming by modeling, and it also provide explicit support to modeling parallelism. The parallelism should be pellucid to the programmer and parallelizing compiler should take the burden of finding and achieve potential parallelism. Both approaches are feasibly to combine in fixed beneficial relationship. The language can be spread with extra linguistic constructs that build higher level parallelism epitome. The underlying concurrent language does not need to be changed is the inspiration for library approach. The uncontrolled access to data and hardware resources are sometimes flexible and these provide by external library primitives. The specific classes encapsulate the library services to overcome this difficulty said by some authors. The end users adapted to their specific need using extending parallel class library. The parallel Object Oriented Programming has proven, it is essential building approach in a number of applications sectors such as telecommunications, banking and scientific computing. In the AI (artificial intelligence) with that fields parallel Object Oriented Programming occur in close interaction. From the research’s point of view need to enhance the plan and appliance of congruent Object Oriented Programming platforms and to grow their applicability [39].

4.5 Models of Object-Oriented Language

The concepts supports like instances, classes and inheritance that type of language is defined as object oriented language. Following section would be explaining the above concepts.
4.5.1 Objects

The concepts which respond to messages are the thing is objects. The operations are carrying out by passing messages request to one object to another. A set of meaningful use supplied by and suitable that object are the operations of an object. The creation of operations hidden object from its users because every object can provide encapsulation. Local variable within an object are defined by internal data structures. The access of local variables depends on accessible range through its operations. They mostly attention to areas of Object Oriented Programming with the help of result and design course material that needed. Some research shows that there are lots of difficulties faced by teachers to teaching programming concepts to students. The objects cannot affect to each other objects hides the not essential detail, and the actual realization on which object is independent by the usefulness of encapsulation. The every substances of systems used to be objects and binding in pure object oriented approach. The concepts like classes, friend function, constructor calling, overloaded constructors, abstraction, polymorphism and other object oriented concepts are difficult to understand students. Figure shows the object based language model basic principles: local variables, operations and creation of operations.

Fig-36: Language model object based

4.5.2. Classes

The extraction and gathering objects according to their ordinary behavior is called class. The separate objects are also called as instance of a class and they can maintain special properties in the form of single values of their local variables. For the purpose of calling new operation by requesting instance of object can be created from class. Operations are called methods in some object oriented languages. The concept
operations can be used in the place of methods to leave disarray with software development methods. The instance variable is also known as local variable.

4.5.3 Inheritance and Delegation

The configurationally organization of classes is inheritance and a class may inherit operations or methods and local variables from its superclass, and same operations perform by its subclasses. The arrangement of classes would be done by organizational inheritance relation, so that they can be planned to reuse. Providing additional reusability by inheriting classes multiple parents’ classes. An example of a single inheritance hierarchy is given:

Number Integer
Fraction Real
LargePositiveInteger LargeNegativeInteger
Small Integer
max(a Number)
else return a Number
then return self
if self >= a Number
a b
a inherits from b

Inheritance hierarchy example shows, operation max by class Number is implemented. They define all other ordinary features and class Number is parent class of other classes. They provide their own special operations and data structures by the classes Fraction, Integer and Real extends class Number. As same as, LargePositiveInteger, SmallInteger and LargeNegativeInteger extend class Integer. The new technique can be introduced as a variant to inheritance called delegation. The appliances that grant to envoy the request of its users to one another delegation. The delegation is large scale than inheritance because it backup vigorous growth of system because delegations can be configured at runtime said by originator of delegation based language. A delegating object is part of identity is delegation, the delegated object [43].
4.5.4. Polymorphism

Polymorphism grants separate things to reply to the similar message. Each objects to react to the same message in a way exact to the object by message passing semantics. The application of the inheritance mechanism is the redefinition of a message through inheritance as polymorphism. The implementation max(aNumber) declared in class Number is a polymorphic functionality in above example. The derived classes of class Number to access its definition that enables by defining operation max at class Number. Separate derived classes of Number applied with operation because the polymorphic variable self is limits to the instance object that obtain the operation max. They provide reusability of operations with the combinations of inheritance and polymorphism. The message max(aNumber) can be react by subclasses of class.

4.5.5 Structural Relations

A very small amount of special types of relation that may be fully considered Object Oriented analysis. Classification and part of relations are the two more essential relations present. There are two relations present but describe relations with associations by some methods other than classification and part of relations among classes. The relation is present between classes as specialization of another class is one another class present. Suppose we consider that part of relations may reproduce part entire relations. We consider an example an organizations consist of departments. The resulting in classification trees and some cases as the leaves, the root of the tree this is a general way of creating abstractions. The part of relations having different methods has differences in semantics. The encapsulation for part of relations is the main principles adopt by methods and whole parts are invisible or hidden. Some researcher says parts are directly addressed and parts are visible from the outside world. The parts of relations are sometimes matches in analysis phase using subsystem partitioning. The class inheritance hierarchies sort the classification structure in the design and implementation phases. There is a lot of reasons class inheritance hierarchy is useful. The number of classes that may appear in a design provides a means of structuring and managing. The classes easily introduce extensions to existing classes and differ in aspects of specialization of class. The possibility for reusing already available classes is slightly enhances. It may be changes for different reasons in the identified structural relation dusting design and
implementation phase. The single inheritance can be map using the reusability, encapsulation and modularity used to design rules may result in restructuring, in all phases of software development. It may be needed to introduce so called abstract classes to build a proper classification hierarchy. The method max of class Number in figure to define executable operations by interface [35].

4.6 Object Interactions

The object interactions using the structural relations define the architecture of a system and sun time behavior of the system. The dexterity provided by message connections. The objects are communicated by using simply indicating message connection. First of all structural relations have been resolved then message coupling are usually identified. Object communication should know the concept functions which object request. Suppose we consider the association relations example as a relation between a employee and boss is plausibly realized by switch of several message. The function to be consider as payable, displayRes and performActivity. Object communication should be modified as a outcome of different design decisions in the design and implementation phases. In general, biding of data function and modularity tend to strike with accomplishment demands are the software engineering principles. The communication between objects may be change during design and building phases to proved accomplishment demands for the purpose of result[48].

4.6.1: Problems Related to Object Interactions

a. Multiple Views

There is no need of attention to another instance that use its utilities supplied by an object operation. Differentiating between clients, views can be define for the given objects. Suppose we consider an example of school as students teachers cane handles by class teacher and Stud individually. There are also uses classes TeacherReg and StudentReg are used for management purpose. The courses are amenably taken by part of teachers and are record as students. Sometimes in this cases teachers contingent on the framework that functioning. The multiple views of objects cannot express by the object oriented methods that we studied. An object in different languages such as C++, PAL and Owl. The generally mechanism differentiating between the subclasses of an object, object itself and other client object. Different types of external client objects do not allow any distinction between objects. The concept of private operations is acquainting by the Smalltalk programming
environment but it is not enforced by the language. The newly introducing a different object for every view cannot be simulated multiple views.

\[
\begin{align*}
\text{Teacher} & \quad \text{Registration} \\
\text{Teacher1} & \quad \text{Student1} \\
\text{Teacher1} & \quad \text{Teacher2} \quad \text{Student} \\
\text{Teacher1} & \quad \text{Registration} \\
\text{Student1} & \quad \text{Registration} \\
\text{Teacher1} & \quad \text{Teacher2} \quad \text{Student}
\end{align*}
\]

4.6.2. Queries and Language-Database Integration

The structures, queries, transactions and preserving data in software development do not address the database issues in object oriented methods. There is only respect to the definition of preserving objects, but few methods address database issues. There are two separate languages and structures of data have been suffers from the need to manage. For the integration of object oriented paradigm for two separate systems for framework that uses numerous attempts for managing. The both data management and application programming are computationally model for the integration of higher level of the object oriented model. Generally the basic elements provide sufficient data handler, querying facilities and transmission supported by present object oriented database systems. But there is drawback present the mixing of language and systems database cannot be consider being consummate comfort. The conventional database mechanisms would be extended by an object oriented computation model for system such as query languages; the programmer still has deal with two different systems. The necessity of object type links, explicit objects lookups and the SQL interface force the programmer to deal with two distinct systems. The
object oriented language model introducing database like features generally weakens encapsulation. The query capabilities are limited to objects of group of classes in smalltalk and gemstone. Queries are defined on all instances of a class, thereby produces sets and resulting sets cannot be restricted further, these problem with Orion’s approach. Classes and aggregates are directed by queries[36].

4.7 Object-Oriented Frameworks

Object oriented framework was the most important bestow of Simula 67 is one of the best construct. These are always subprogram to the main program is the name suggests is known as subroutine and these subroutine libraries were well known. The relation is always handled by subroutine used p and q. When a end user-written subprogram p is supplied as an argument to a library sub function q; in this case, q can indeed call p, only exception to this. The calling is done using only call is made call from main program to q and callback to p could occur. It able the opposite relationship to the main program and a component can be called by the framework that Object Oriented framework is allows sub programs. The code that explains the behavior of the instances in the system is simulated by the programmer. The products customer or the nuclear fuel rods are need to related about domain being illustrate. User defined objects are also called simulation framework. The goals of users were able to populate is in controlled by framework. Providing these functions might be a lot of work, but; all the user need do is override the inherited behaviour optionally.

The user interface framework is the idea of object creation one of most same. The communication between objects can be done by object on computer screen request to display framework in object oriented languages. The objects of derived class framework supply a class java.awt.component. It’s simulation characteristics are supplied by OO framework called simulation and Simula 67 is a general-purpose language. Simset is defined as simulation is primitive framework can be builded.

4.7.1 From Simula to Smalltalk

The version is used only within Xerox Parc and version named Smalltalk-72 was an nearest form of Smalltalk. The ideas of objects, classes, and inheritance and object references are taken from simula animated by simula. The exploration of the instances idea as small computer by Smalltalk-72. Differencing in the weight that they gave to instances, classes and inheritance object oriented languages has been
developed. It categories the characteristic of contemporary instance oriented languages, considering Smalltalk, C++, and the local Lisp Object System. Some authors said that important concepts as follows.

- Operations requests Identify.
- Identify instance by request.
- New instances can be created.
- The similar functionality can be implemented to the different objects
- An instances embodies an abstraction.
- Services provides by objects.
- Services can be requests to clients.
- Encapsulation of instances.
- Classification is done in terms of their services of objects.
- Objects can share coding.

Classes as modules are not on this list and we see that objects as processes. The researcher said that idea associated with the notion of objects but not important and active objects as an associated concept. A module does not display to at all but classes can serve the given idea.

4.7.2: Objects as Abstractions

In many different senses a word abstraction is used in Informatics. The evolution of the feature of an object is used by functional programmers. Both over time and as objects migrated across the Atlantic, Simula's idea of procedural encapsulation became more complete. The other features of the simula class such as active objects and classes as modules have not persisted. The word abstraction to capture the idea that what matters an object is its protocol in the context of objects. The way that it behaves in response to those messages and those set of messages that it understands, this is sometimes also referred to as the objects interface. At the time of using object, we abstract the internal structure of an object is hidden form all other objects is the theme of abstraction. One of the key ideas behind objects, but it does not appear explicitly in sense of abstraction. It speaks of instead of modelling, which captures the importance of interacting with the object, but not the information hiding aspect and is not specifically mention. Suppose we consider an example a pity that the variable attributes of a Car process could not be hidden away in a sub block and
hiding the procedures that defined the Car’s behavior and exposing those defining the procedures for car.

To improve software maintenance as proper training of both professional developers and students. For improving their university education and preparing those for jobs in industry and understanding cognitive difficulties the students have while maintaining object oriented systems is a prerequisite. In software implementation is becoming largely famous because of object-oriented approach. A momentous number of object-oriented functions currently under development introduce those methods. The robust highly extensible and reusable software creates in OO process and claim that methods. We considered being the most promising to consisting certain aspects of existing methods. We find a number of essential shortcomings within current object-oriented methods on the other way. Software engineers can now ready to deal with these specific problems, when encountered in object oriented development and the methods address these problems explicitly. The analysis and design method evaluate some extent of time to detect what was fault occurred. The problems discussed may initiate new researcher to inspire from other researcher. The basic characteristic of the object oriented model [39].

4.8 Quantifiers and Comprehensions

There is well known quantifiers as products are useful in description. The convenient notational shortening that found set of comprehensions by mathematicians. The use of comprehensions notations for list to great effect of other functional languages. These both are identically useful and essential descriptive languages have generalized quantifiers and comprehensions. Where comprehensions act as literals for modeling types and generalized quantifiers are notational shorthand’s. The important characteristics are set comprehensions the utility of comprehension notations. Suppose we consider an use of a generalized quantifiers number of, which totals the series of integers ‘r’ that both comfort the limits predicate, 0<=r && r<args. The length and body predicate by set. In a loop invariant numerical quantifier is used. Expressions pose several pitfalls for specification language designers are quantifiers and comprehension. An example shows if non garbage objects quantify only quantifiers and they become sensitive to garbage collection, which sequentially objects oriented programs specify and verify.
4.9 How to teach Programming

Anyone studying computer science must redeem with learning of programming skill. The quality of programs can be binding the conceptualization design and testing by using computer skills has the correlation between qualities of programming. There is many professionals acquire skills depreciative and analytical thinking, depreciative substances to component details that are all programming students acquired. Any meritorious of respect curriculum must include programming shown in before researchers in their articles. There is number of difficulties arises with teaching programming using traditional mode. The learning of programming as a especially curious activity said by many researchers. It is still considered a challenge acquiring for more than 50 years to the introductory courses. The methods of teaching about not known about nature of the programming process and this is the reasons for that situation. The programming is a complex occupation, an intricate correlation of science and art and even more complex to teach. The C++ is intermediate courses in some other universities and it is introductory commonly used programming. The developer to take advantage of different programming paradigms and C++ is complex language. Using C++ allows are to master as least two paradigms and allow accomplishing these exhortations at an early stage of training. C++ is hard for beginners that one cannot controvert and it has great potentialities with a complex syntax. The given problems encountered to students within language development and also efficiency of programming, modern requirements for high reliability and security, but restructuring the courses goals to make them as easy as possible without compromise in quality of training. The new standard for the C++ language was the main impetus for that and the given essential changes reveals later or sooner in the academician.

4.9.1 Programming Courses at Our University

The first attention to the way of developing language is C++ is creating as an introductory to programming for bachelor programs. The introduction to programming starts from the initial themes of mandatory and procedural programming is to be considered in old past implementation of program paradigms and languages. Then which goes on to the objects that has new concept to students or learners. The concepts like data_types, arrays, files, operators and technology can be used to testing programs are include in introductory courses. The movement from
procedural language to OOP (object-oriented programming) is the most solemn call throws for paradigm shift. The teachers or instructors use object oriented languages to essential factors of the language for introductory course and they focuses on operators, functions, expressions and elements of regular old procedural model. The basic requirements for their training are mastering these techniques and they mixing number of difficulties when learning OOP. There is implementation of similar study of software technology and object oriented programming and also incorporates elements of object oriented design analysis. The traditional imperative programming style is used acquainted by students very well to importance of it. The object oriented language supports parts of the building of any method of any class and procedural constructs. The functional programming and Logic programming is presented by declarative style of programming. Various script and markup languages take place in the intermediate and important programming languages like Java, C# and advanced levels of training through elective courses [12].

4.10 Object-Oriented Programming

4.10.1 Move Semantics

The rvalue reference type is the start element that we used. It is easy to implement move semantics with rvalue reference. The most essential feature of the C++11 that point of view of lackness. The compiler to exchange the very costly operation of copying objects and with less cost “state movement” operations that allowed by move semantics. The learning of Object Oriented Programming with C++ is more difficult task than pure Object Oriented Programming languages like java, Eiffel and Smalltalk. The code efficiency and logic of C++ and inherited from C have the difficulties.

Here consider an example of Object Oriented Programming is the construct of the three methods copy assignment operator, copy constructor and destructor for every class that has an encapsulating complex data structures, data members and external resources pointer. The semantics value or outcome utilized are well determined by copy constructor and copy assignment operator. Sometimes it is beneficial in many conditions data copying is needed and perfect operation but there is also problem arises while duplication of resources.

Suppose we consider an example of swapping two objects such as swap operations, container reallocation and string concatenation.
template <class T>
void swap1(T & p, T & q)
{
T temp1(p);
p = q;
q = temp1;
}

The construction of swap() is effective in case when parameters are numeric or Boolean. In some cases, the drawback of this approach is even clearer, even objects swapped are containers. The copying is done using container reallocation construct have the dazzling example of incapability. Container elements as well as to call the copy constructor for each element of the new buffer and use new memory buffer to hold existing allocated container elements. The destructor is used to get back the original elements and to free the memory for original buffer. To construct move semantics that will be write code for moving resources dynamically memory from one object to another. Exchange the value of internal pointers and values of objects sizes are the example of swapping values of strings. The construction of such an operation requires a special function. These characteristics are supplied by the movement of resources form new reference type. The popular compilers are also available in C++10 and before the standardization of C++11. We can easily code move semantics in concatenation with the aged reference type. Another point of program cannot be reference semantics works precisely. Changes in Standard Template Library (STL) are language development accompanied. To use move semantics algorithm and containers operations are optimized. The handling of complex and large structure using STL algorithm is much semantics for result efficiency is significantly increased. The essential aims of education are to acquire ability to write efficient, safe and trusty code because future professional programmers are students. The special place in the object oriented programming to copy semantics. We cannot ignore the move semantics because of same reason. Students are use Standard template library containers and algorithms even if they are not trained specifically to apply it. Learning char strings and exchange two strings using the operator std::swap(s1,s2) function template version of convert is used students in the introductory course. To design class and architecture behind future professionals. Adding move semantics to a certain
class to alter constructor and a transform assignment operator should be defined. The following example shows simple learning of new syntax creation and individual data member present buffer in memory pointer [25].

class K
{
    char* da;
public:
    K(K&& other):da(std::move(other.da))
    {
        // move constructor
        other.da = nullptr;
    }
    K& operator=(K&& other)
    {
        //move assignment operator
        if(this == &other) return *this;
        if(da) delete[] da;
        da = std::move(other.da);
        other.da = nullptr;
        return *this;
    }
    //......................
};

First of all the member function and member data set to their default initial values before assigning and pointers stage is performed. Here the destructor to continuously free resources such as dynamic memory. Neither only classes nor separate function have advantage to transfer. The student encourages getting accustomed and using std::move1(). It is beneficial to implement this by predefining the template function swap1() and shown below.

template <class T>
void swap1(T& x, T& y)
{
    T buf (std::move1(x));
    x = std::move1(y);
}
Many students get confused in the starting some lessons in object orientation is rich and complicated. Because of complication some of the students leave the course. The student’s regular repeating same bugs after teachers tell them the right answers. An instructor or teacher explains what they need to know till struggle to solve problems. The students having difficulties or may have problems that explain to an instructor or teacher. Sometimes these situations arises for many occasion

a) It is difficult to find students commits same error how many times same errors and so we can see problem solution patterns repeat.
b) To overcome the predetermined conception of many students is difficult to know. For example, some students having past knowledge of information in a procedural programming language such as Basic and which repress learning of OOP. Sometimes some situation occurs the student knows and doesn’t know one understand and same is hard to interpret the problems from the student’s viewpoint.
c) To analyze each individual student is difficult to take all common errors and learned knowledge into account.
d) The teacher or instructor unable to tell why students having these difficulties and there is not enough time to look every students needs in a big class room.

The some researcher says that personally one on one teaching method that individualized attention to students or learners overcome the learning difficulties. The different industries where companies are using this tutoring system to perform job functions train by them and not only use only in academia but also in industry. The current technology most focus is on Object oriented programming from the aspects of procedural programming languages and languages like java,C++ more attention now a days.

4.11 Encapsulation and Information hiding

The procedure of an instance and removing the internal data and supplying an communication media in between objects in such way to solved possible outcomes is the principle of information hiding. Consider an example that the object is accessed whenever they needed instance variable and data that knowledge hiding or providing
simula on protection. To providing well declared interfaces to their objects mediated classes by object oriented languages. Suppose we consider an example of C++ has general binding protection appliances with member public, protected and private. The access for public data member and member methods having accessed from anywhere. Private members are accessible only from within a class. Protected members can be accessed by subclasses only. The array data of list be always private. An essential factor in generating binding of data is the design of separate classes of instances or objects that work using a common objects user interface. The many objects reply to the similar message, but each will perform the message using operations guided to its class. The implementation up to receiving object with using send message a program and which minimizes interdependencies and maximize the amount of exchangeable and reusable code. Suppose we consider an example of Car engine that may differ in implementation and the interface between car and driver is through same object. The drivers knows this protocol or object, all drivers can use this method in all cars no matter which engine in car. The given informatics detail is spread from the rest of the car and from the driver. A benefit of the object-oriented concept that binding of data is considered and polymorphism is select essential information is data abstraction.

4.12 Learning Difficulties in Rural education

The term ‘Learning Difficulties’ was first mint in 1963 Dr. Samuel Kirk, a psychologist, education conference given the speech held in Chicago. The National Joint Committee on Learning Disorder (NJCLD) describe basic terms of learning difficulties as “a heterogeneous group of disorders exhibit by consequential difficulties in the asset and use of listening, reading, speaking, Writing, reasoning and mathematical abilities Pandey (2014). Now days in rural education system student can faced many learning difficulties of OOP. Learning difficulties are not only neurologically based processing problem it is also problem of impact of external environment of colleges or educational organization. In existing research on learning difficulty find out net based difficulty affects on student skill, behavior, learning quality, adoption and thinking power, but we find some query in existing research. Our main aim of research is to find OOP learning difficulty, types of difficulty, and solving problem using computer based learning. To find OOP learning difficulty is first section of our research. Many researchers define OOP learning difficulty as per their view. Mathematical skills are basic to autonomous living in a numerate society,
affecting educational and employment chance and in turn, the socio-economic status. An understanding of how notion of numeracy evolve, and the manifestation of trouble in the acquisition and adoption of such concepts and skills, is imperative. In today's high-tech, increasingly connected world it is important to self development and enhancement using technology and confidence, it is vital that young boys build confidence in their ability to do mathematics, read, write, think. Professionals are important to concur on one specific definition of a learning difficulty. What experts do agree on is that this group does not learn for a variety of different reasons.

### 4.12.1 Characteristics of Learning Difficulties

- Problem with learning new skills, relying on memorization
- Problem with learning about time
- Difficulty remembering truth.
- Learn to hard new things
- Difficulty in logical concepts
- Lower coordination, 'accident prone', ignorant of physical neighboring.
- Having a hard time learning the bounding between letters and sounds (Phonetics)
- Lack of planning and poor event organization.
- Spontaneous behavior
- Exchange number sequences and confuses arithmetic operation and symbols such as +, -, x, %.

### 4.12.2 Types of Learning Difficulties:

Following three types of difficulties are affect on learning process. In our present research we can analyse two types of difficulties

- Environmental or Infrastructural learning difficulties
- Network based learning difficulties
- Difficulties in OOP
- Understanding problem in conceptualization
- Learning analysis
Fig-37: Learning difficulties types

4.12.3 Environment based learning difficulties

Student in rural as well as urban area required to quality education for their career enhancement and achievement. We prepare many literature of review to find learning difficulty in rural education. We observe most of problem of education are to be faced student in rural area. In India near about 70% of colleges located in rural area but main basic problem is providing good quality education a serious issue. Aim of our research is to find learning difficulty in rural area like Dhule district. In existing research we study learning difficulty in rural area and one thing is observe each researcher conclude network based difficulties are affect on student educational carrier but when we study and do survey of Dhule district we conclude that learning difficulties is not only depends on network condition for E-learning structure condition of student it also depends on environment and infrastructure of college. In rural area most of scholar student and ability of this student is to achieve large success in their educational carrier but in rural colleges are not able to provide quality education and good infrastructure to motivate that student and provide quality
education. Environment base difficulties include poor infrastructure, old teaching method, open space learning, less knowledge of teacher, less availability of equipments, deficiency of technology, book oriented education, poor economy of student. Due to this type of problem normal or scholar student in rural area are convert into difficulty faced student.

4.12.4 Lack of transportation

In India lot of taluka’s or villages are not connected with proper transport facility, so government have problem to build college building. A most of time student walk up distance to come colleges. In this way student definitely fill demotivate for attending regular class. Student in rural area due to transportation problem they leave the school or colleges. In this cases many scholar student in rural area are leave the colleges and goes to working in farm. Means due to transportation problem student leave the colleges and join employment and this problem make student education.

4.12.5 Lower family income

A lot of person who belonging to a remote area, whose income position will be less. In family four or more person are available. They totally depends upon elder or responsible person in family but family need are increasing that time more than person will be do a work become necessary

4.12.6 Insufficient school and colleges

In rural areas not every village provide school and college due to less population in village. Student in rural area travel great distance avail this facility. But due to poor economical background and uneducated parents student leave the education and searching employment.

4.12.7 Lack of proper infrastructure:

In rural educational environment student can take education in open space due to lack of building or well furnished room. And these types of environment affect the tendency and interest of student in education.
4.12.8 Less quality:

Most of colleges in rural area are government. The quality of Government College and private college are much different. Private college provides more facility than Government College but fees of private college are not affordable to rural student.

4.12.9 Limited Availability of teaching tools:

According to changing world it’s required to use new teaching tools like proper text book, proper learning material, computer, internet, projector, virtual class room in education. But in rural education it is not possible due to limited computer literacy, discontinuous availability of electricity.

4.13 Supporting Education Through ICT Implementation

Inclusive education presents a new vision for difficult students with special needs take education in normal classroom like normal student using Inclusive methodology through ICT tools. To fulfill this we required to provide for the applicable conditions of overcoming the hurdle to the learning process in rural area. Particularly speaking, these conditions are obtained through the facilitation of ICT infrastructure for SNE, integration of ICTs into SNE curriculum and training of ICT specialists in SNE UNESCO (2006). Inspire ICT infrastructure for SNE is necessary in order to provide for the appropriate conditions of teaching and learning in the special need education context. The conditions in every type of comprehensive educational region cannot be successfully built without the exact ICT tools applied. Assistive tools must be applied to permit students with special need education to involve in the educational process based on special techniques and equipment. Support curricular changes and new learning experiences.

In this way it is possible to fulfill the specific learning needs of different learner groups, including students with difficulties. Though particular applications of ICTs are extremely various and assorted, they may be grouped into the following main categories:

- Compensation uses.
- Didactic uses.
- Communication uses.
ICTs for Compensation Uses

That is the utilization of enhance technologies as a technical support that permit disabled students with special requirement to take operative part in the procedure of interaction and communication: if a individuals has motor disability he may be helped to write, or to read if a student is with a visual disability. From this point of view ICTs develop the students’ ability to control their environment, make choices about their experiences, support problem solution of student, help to information, thereby improve communication with others both in the instant environment and across the world.
 ICTs for Didactic Uses

In rural education ICTs perform vital role as a learning tool have provide a new dimension of education and initiate the alteration of the educational aspect. ICT application brings a different type of new teaching and assessment method for students with different educational requirement. Here we must note that information technologies as a modern tool are suitable for deploying the inclusive education, In order to enhance student personal development.

 ICTs for Communication Uses

Technologies can implement use to enhance communication skill and moderate communication with student having disorder. Assistive tools and software to fulfil the requirement of students with definite communication disorder are particular to every disability. This task is very useful to develop communication skill of student and improve their learning skill and proper knowledge of language. Computer it is the best and advance approach for communication.

 Assistive technology for student with special educational need

Now day’s technology has become a crucial and fundamental component of the education and no any school or college are successes to provide quality education without technology, the assistive technology being an important part of education for difficult student. Consequently, the assistive technology is the foundation of a modern educational process including students with difficulties.

Assistive technology will be provide technical tools and assistive software for difficult student and also help to disabled student which is not able to take education like normal student.. AT is the part of ICT that provide new application and supporting tools for difficult student in rural area. Assistive technology for difficult student learning is one of the most essential and important elements in making education more inclusive and enhancive. Assistive technology mention to any device and tools, service, system, that permit student with learning difficulties employ in their daily routine, education.

The term technology explains not only physical objects equipment, devices or more generally it mention to products, ‘ways of doing new things that contain multiple technical rule and element. Over the last few years, the computer performs
the vital role in educational sector to finding all kinds of solution. Computer is the large source of information it provide enhance way to disable student to learn easily with effective manner. For support the inclusion of students with learning disabilities. Assistive technology performs a basic role in take out the process of inclusion.