# DEVELOPMENT OF EDUCATIONAL KIT USING THE BASIC OPTICAL COMMUNICATION SYSTEM

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## ABSTRACT

This educational kit is developed to provide an understanding of the fundamental principles of optical fibre at the college or school level. It is a communication by transmission of light through ultrapure fibre. There are three major parts perform this task of communication: a light source, an optical fibre and a light detector or receiver. Basically, the system simply converts an electrical signal to an infrared light signal, launches or transmits this light signal onto the optical fibre by total internal reflection and then captures the signal on the other end where it converts it to an electrical signal. The heart of this kit is specially designed one-way communication system using microphone and speaker. The use of standard laboratory equipment along with this kit are required. For examples oscilloscope, wave-form generator, voltmeter and spectrum analyser.

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# 1. INTRODUCTION

Optical fibre technology has been in use for more than 20 years. However, it has only been since the early 1980s that fibre optics has truly transformed the nature of operating transmission networks, changing forever the standards of quality and the economies of bandwidth. Today fibre optic has become a standard telecommunications transmission approach widely used.

Sending an information over fibres require transmitters and receivers analogous to their non-optical counterpart for other media. That is, an information signal is conditioned to drive an active device that aids in matching the characteristic (i.e. impedance) of the transmission medium [1].

As shown in Figure 1.1, optical fibre communication system is similar in basic concept to any type of communication system. Generally, three main parts should exist in the system, those are the transmitter, transmission medium and destination (receiver).

For optical communication system an input signal (either analogue or digital) provides an electrical signal to transmitter that drive an optical source to give the modulation of the light-wave carrier. This optical source may be either laser or LED. For analogue modulation it involves the variation of light emitted in continuos manner but for digital modulation, discrete on-off pulses of light intensity are obtained. To be useful in any optical communication system, a light source needs the following characteristics [2]:

- It must be possible to operate the device continuously at room temperature for many years.
- It must be possible to modulate the light output over a wide range of modulating frequencies.