PHET PLATFORM TO SUPPORT THE TEACHING OF FLUID MECHANICS DURING THE COVID-19 PANDEMIC

Daniel Rios [1*], Tania Grisales[2]

[1] Professor of the Cooperative University of Colombia, Medellín, Colombia, [2] Student of the Cooperative University of Colombia

*Correspondence YP: juan.riosar@campusucc.edu.co

Abstract This research work presents the results obtained to use the PhET platform for teaching of fluid mechanics during the COVID-19 pandemic in the Cooperative University of Colombia. The PhET Interactive Simulations Project is distributing under the Creative Commons-Attribution 3.0 license and the Creative Commons GNU General Public License. The most important finding is the connection development between the students and platform due to the confinement condition, the use of PhET platform was like to "game" and improve the mood of the students. We conclude that PhET platform is excellent tool for teaching of fluid mechanics during the COVID-19 pandemic if the student has a good computer equipment. **Keywords:** PhET Interactive Simulations, COVID-19, fluid mechanics, teaching.

Methods

We use the PhET Interactive Simulations platform that is distributing under the Creative Commons-Attribution 3.0 license and the Creative Commons GNU General Public License by University of Colorado at Boulder. For the laboratory practice 10 flow rates (discharges) were selected in the range between 1000 and 10000 (l / s), later for the constant pipe area equal to 3.1 m², velocities to full tube (Table 1) were calculate corresponding to each flow rate (discharges) selected and finally the curve Flow (m³ / s) vs Velocity (m / s) was constructed.

Table 1: Relation of discharges and Velocities.

Flow (m³ / s)	Velocity (m / s)
1.679	0.54
2.053	0.66
3.269	1.05
4.532	1.46
5.608	1.81
6.169	1.99
7.666	2.47
8.040	2.59
9.069	2.93
9.911	3.20

Results

- The most important finding is the connection development between the students and platform due to the confinement condition, the use of PhET platform was like to "game" and improve the mood of the students.
- We conclude that PhET platform is excellent tool for teaching of fluid mechanics during the COVID-19 pandemic if the student has a good computer equipment.
- In addition, the concepts of discharge, velocity and unit energy loss that were explained in class are apply by student for PVC material in appropriate form (Figure 1).

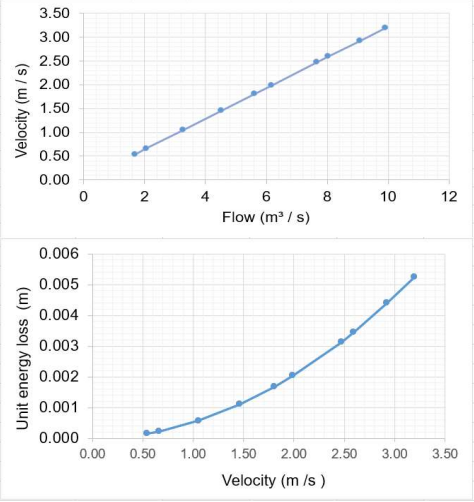

Figure 1. Relationship between discharge and velocity (above) and relationship between velocity and unit energy loss (under).

Conclusions

We conclude that PhET platform is excellent tool for teaching of fluid mechanics during the COVID-19 pandemic and normal condition because is interactive and easy for all students, therefore we recommended this platform for digital laboratory practice and examples during the COVID-19 pandemic and for the time post pandemic.

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Bibliography

University of Colorado. (2004-2013). PhET Interactive Simulations platform.