

國中學生對於科學與科學家的認識之研究  
An Investigation of Junior High School Students' Views of Science and Scientists

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中文摘要

大約自一九〇〇年以來，對於科學本質與科學家的認識，一直是科教學者努力的課題。研究顯示，一般大眾對於科學的了解與對科學家形象的認識，常有偏頗或扭曲的看法。甚且，這些看法也常是來自於電視、電影、漫畫等的傳播。所以，本研究旨在探究：一、國一學生所繪畫的科學家形象，所表達的意涵為何？二、國一學生對於科學的了解為何？三、國一學生對於科學家的認識為何？四、國一學生對於「科學家角色」看法與「科學知識」看法的分析。總共有三十七位國一升國二資優班學生參與這項研究，先請其繪出科學家的形象，並從中選擇五位學生進行晤談，進而分析晤談資料，以獲得這五位學生對於科學與科學家形象的認識。然後，有二十三位學生前往美國奧勒岡大學參加一週的科學與文化研習活動。最後，則以一份數量化的問卷，探究國中生對於科學與科學家的傳統與當代的見解。研究發現這五位國一學生有部分的了解、印象與以往的研究有相當程度的類似，諸如外表、工作場所與器材實驗等。這也說明有關科學的表徵是沒有國界的。其次，這些學生雖認為科學家主要工作是創造、發明，可是，卻常認為技術的發明也屬於科學的範疇。惟，有一位學生能指出科學家主要的工作是在知識的追求。此外，亦有學生認為科學研究須要沈思、假設、討論及發表成果等，這些都是較具深度的認識。此外，未出國研習（十四位）的學生相較於出國研習（二十三位）的學生，呈現較傾向於傳統的科學家角色之觀點。甚且，學生對於科學家角色與科學知識的相關性之檢驗，也呈現了一些有趣的結果。為了提昇國中學生對於科學與科學家的認識，後續的研究更應結合科學教學與有關的教學活動，期能較清楚、有系統的了解國中生的看法。

關鍵字：科學本質；科學家形象；國中學生

## Abstract

The purpose of this study was to investigate (1) the views of scientists held by junior high students, (2) students' understandings of science, and (3) students' knowledge of scientists. All data related to the views of science and scientists were both qualitatively and quantitatively analyzed. Thirty-seven students in an intact class were invited to participate in the study. The students were gifted students. All students were asked to draw figures of scientists at the beginning of this study in June of 1999. Then, five students were selected to be interviewed, based on the completeness, focus, and clarity of their drawn figures. The main objective of this follow-up interview was to probe students' understandings of science and scientists, and to further clarify and explain what they had drawn. Then, twenty-three of these students participated in a science and cultural program provided by Oregon State University, USA. Finally, a questionnaire was used to investigate students' traditional versus contemporary views of scientists and scientific knowledge. This study supported the results of earlier studies, especially with respect to the scientist's appearance, workplace, equipment and laboratory. It was interesting to note that the symbols of science seemed common in this world. Although students recognized that the major works of scientists were the creation and discovery of knowledge, they tended to categorize the creation of technology as part of science as well. However, one student pointed out that the scientists are the ones who are trying to generate new knowledge by conducting research. Several students also mentioned that speculation, assumption, discussion and publication were all needed in scientific research. It should be noted that the 14 students who did not participate in the program at Oregon State University tended to have traditional views of science and scientists. Overall, students tended to have contemporary views of scientists' roles, but they still held traditional views of science. In order to enhance students' knowledge of the nature of science and their views of scientists, specially designed activities and field experiences should be included in science classes. It is recommended that a follow-up study be conducted in the context of an instructional approach that integrates museum and research laboratory visits with various classroom activities. Such an investigation should provide further information on how teachers can facilitate the development of students' understandings of science and scientists.

Key words : Nature of science; Images of scientists; Junior high students