**Lecture 7** AP Statistics Identify Outliers & Boxplot

1. **教学目标**
2. 会计算IQR，了解 的内容，会计算five-number summary，会画箱线图；

Calculate IQR and know the ; Calculate the five-number summary and use it to make boxplots;

1. 理解IQR的原理，会用IQR解释离散程度，会用识别异常值，会解释箱线图；

Interpret IQR for a distribution of quantitative data; Use to identify outliers; Interpret the boxplot;

1. 了解的原理以及与、2 standard deviation rule的联系和区别.

Understand the and some similar rules:, , etc.

1. **教学重点，难点**

* **重点：**计算并理解IQR，了解 的内容并运用识别异常值，画箱线图并解释箱线图.

Calculate and interpret IQR;

Know the and use this rule to identify outliers;

Use the five-number summary to make boxplots;

Interpret boxplots from four points.

* **难点：**解释箱线图，了解的原理.

Interpret boxplots and understand the .

**（三）教学方法**

复习IQR的意义和计算，并通过对“describe the distribution”这类题解答过程中学生们对于识别outlier的好奇，引出. 引导学生探究其原理，并联系社会问题使学生意识到知识的实用性. 课堂上在老师引导下，以学生为主体，讨论boxplot每一个要素的必要性. 老师为学生创设问题情景，鼓励学生积极探究.

**（四）教学过程**

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| 教学环节 | 教学内容 | 师生互动 | 设计意图 |
| 复习引入 | 复习IQR，提出问题，并引出新课. | 提问学生：IQR是怎么计算的呀？计算IQR需要知道什么呀？IQR说明了一组数据的什么特征呀？  老师给出评论和鼓励. | 以旧引新，通过设疑，引导学生开展积极的思维活动. |
| 的引入 | 识别outlier的方法 | 通过前几节课同学们对于outlier识别的方法（看有没有明显的gap），引出一种“标准”：.  提问学生：为什么是1.5而不是其他的数字？  教师给出解释并引出和2-standard deviation，3-standard deviation的联系，以及给出现实生活中的例子：疫苗安全性检测和灯泡厂产品质量检测等等.  给出例题，让学生练习，让学生板书、形成完整的答案，教师给出点评和鼓励. | 通过设疑使学生学会分析问题，掌握法则以及设置法则的原理，通过给出现实中的例子让学生将所学知识和现实联系起来． |
| Boxplot的画法以及所包含的信息 | 画boxplot所需要的信息有哪些；箱线图的优点. | 教师介绍boxplot（box-and-whisker plot），提问学生：结合以前“describe the distribution”的经验，要怎么去描述boxplot.  学生回答，教师对于“shape”的部分补充。 | 引导学生观察，分析，记忆培养学生能力. |
| 例题和练习 | handout | 【NC workers】Determine whether there are outliers  【Shoes】How many pairs of shoes does a typical teenage boy own? To find out, two AP® Statistics students surveyed a random sample of 20 male students from their large high school and recorded the number of pairs of shoes that each boy owned. Here are the data, along with a dotplot:    Describe the procedure for identifying outliers, and use the procedure to decide whether there are outliers.  【NY workers】New York travel time data:  10 30 5 25 40 20 10 15 30 20 15 20 85 15 65 15 60 60 40 45  Draw a boxplot for this set of data. | 用现实中的数据和例子，使学生在巩固知识的同时，有“知识与现实融合”的意识。 |
| 小结 | 从知识，方法两个方面对本节课内容进行归纳和总结 | （1）本节课重点学习了和boxplot，要求掌握法则的使用方法和原理. 注意运用得出结论后对结论的描述.  （2）注意画boxplot所需要素以及读图后对结论的描述：SOCS+context. | 要学生明确本节课的重点和要达到的要求． |
| 作业 | 1. According to a study by Nielsen Mobile, “Teenagers ages 13 to 17 are by far the most prolific texters, sending 1742 messages a month.” Mr. Williams, a high school statistics teacher, was skeptical about the claims in the article. So he collected data from his first-period statistics class on the number of text messages they had sent in the past 24 hours. Here are the data: 0 7 1 29 25 8 5 1 25 98 9 0 26 8 118 72 0 92 52 14 3 3 44 5 42 a. Make a boxplot of these data. b. Use the boxplot you created in part (a) to explain how these data seem to contradict the claim in the article 3. How many pairs of shoes does a typical teenage boy own? To find out, two AP® Statistics students surveyed a random sample of 20 male students from their large high school and recorded the number of pairs of shoes that each boy owned. Here are the data, along with a dotplot: 14 7 6 5 12 38 8 7 10 10 10 11 4 5 22 7 5 10 35 7     Find the interquartile range. | | 对本节内容及时巩固． |